solaredge

SolarEdge Installation Guide

North America Version 3.1

Blue Pacific Solar™
www.BluePacificSolar.com

Disclaimers

Important Notice

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The images contained in this document are for illustrative purposes only and may vary depending on product models.

FCC Compliance

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment OFF and ON, you are encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver (and its antenna).
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by the party responsible for compliance may void the user's authority to operate the equipment.

Support and Contact Information

If you have technical queries concerning our products, please contact us:

USA and Canada: +1 (0) 877 360 5292

Worldwide: +972 (0) 73 240-3118

Fax: +1 (0) 530 273-2769

Email to: support@solaredge.us

Before contact, make sure to have the following information at hand:

- Inverter and power optimizer model numbers
- Serial number of the product in question
- The error indicated on the inverter screen or on the SolarEdge monitoring portal, if there is such an indication
- System configuration information, including the type and number of modules connected and the number and length of strings
- The communication method to the SolarEdge monitoring portal, if the site is connected
- Inverter software version as appears in the ID status screen (see page 51).

Table of Contents

Disclaimers **1**
Important Notice 1
FCC Compliance 1
Support and Contact Information **2**
Table of Contents **3**
HANDLING AND SAFETY INSTRUCTIONS **6**
SAFETY SYMBOLS 6
IMPORTANT SAFETY INSTRUCTIONS 7
Chapter 1: Introducing the SolarEdge System **9**
System Overview 9
SolarEdge Power Optimizer 9
SolarEdge Inverter with AC/DC Safety Switch 9
SolarEdge Monitoring Portal 9
Supported AC Grids 10
Grids Supported by the Single Phase Inverters 10
Grids Supported by the Three Phase Inverters 11
Installation Procedure 12
Installation Equipment List 13
Inverter Transport and Storage 13
Chapter 2: Installing the Power Optimizers **14**
Safety 14
Package Contents 15
Installation Guidelines 15
Step 1, Mounting and Grounding the Power Optimizers 16
Step 2, Connecting a Module to a Power Optimizer 18
Step 3, Connecting Power Optimizers in Strings 19
Step 4, Verifying Proper Power Optimizer Connection 19
Chapter 3: Installing the Inverter **21**
Inverter Package Contents 21
Identifying the Inverter 21
Inverter Interfaces 22
Opening Conduit Knockouts 24
Mounting the Inverter 25
Chapter 4: Connecting the AC and the Strings to the AC/DC Safety Switch **28**
Grid Connection Guidelines 30
Connecting the AC Grid to the AC/DC Safety Switch 30
Connecting the Strings to the AC/DC Safety Switch 33
Chapter 5: Commissioning the Installation **35**
Step 1, Activating the System 35

Step 2, Pairing Power Optimizers to the Inverter 36
Step 3, Verifying Proper Operation 37
Step 4, Reporting and Monitoring Installation Data 38
The SolarEdge Monitoring System 38
Providing Installation Information 39
Chapter 6: User Interface 40
LCD User Buttons 40
Inverter Configuration - Setup Mode 41
Configuring the Inverter Using the Internal LCD User Buttons 41
Configuring the Inverter Using the External LCD Light Button 43
Inverter Configuration Menu Options 45
Inverter Status Screens – Operational Mode 49
Initial Inverter Status 49
Main Inverter Status 50
Energy Meter Status 50
Telemetry Status 50
ID Status 51
Server Communication Status 51
IP Status 51
ZigBee Status 51
Communication Ports Status 52
Fan Health Status – Three Phase Inverters 52
Power Control Status 53
Chapter 7: Setting Up Communication 54
Communication Connectors 54
Communication Types 55
Removing the Inverter Cover 55
Creating an Ethernet (LAN) Connection 55
Creating an RS485 Bus Connection 59
Creating a ZigBee Connection 61
Connecting a Laptop to the Inverter 61
Verifying the Connection 62
Appendix A: Errors and Troubleshooting 63
Troubleshooting Communication - S_OK Not Displayed 63
Error Codes 65
Power Optimizer Troubleshooting 71
Appendix B: Technical Specifications 72
Single Phase 3-6kW Inverters 72
Single Phase 7.6-11.4 kW Inverter 75
Three Phase Inverters 77
Default Trip Limits and Times According to IEEE1547 79
AC/DC Safety Switch 79

Appendix C: Mechanical Specifications 80
Inverter and Mounting Bracket Dimensions 80
Single Phase 3-6 kW Inverter and Mounting Bracket Type 1 80
Single Phase 3-6 kW Inverter and Mounting Bracket Type 2 82
Single Phase 7-11.4 kW Inverter and Mounting Bracket Type 2 83
Three Phase Inverter and Mounting Bracket Type 1 84
Three Phase Inverter and Mounting Bracket Type 2 86
Appendix D: Fan Maintenance and Replacement 87
Fan Maintenance 87
Fan 2 Replacement 87
Appendix F: Replacing and Adding System Components 89
Replacing an Inverter 89
Replacing the AC/DC Safety Switch 90
Mounting a New AC/DC Safety Switch 90
Connecting the AC/DC Safety Switch to the Inverter 91
Adding, Removing or Replacing Power Optimizers 93
Appendix G: Inverter Arc Detection and Interruption 94

HANDLING AND SAFETY INSTRUCTIONS

During installation, testing and inspection adherence to all the handling and safety instructions is mandatory.

SAFETY SYMBOLS

The following safety symbols are used in this document. Familiarize yourself with the symbols and their meaning before installing or operating the system.

WARNING!

Denotes a hazard. It calls attention to a procedure that, if not correctly performed or adhered to, could result in **injury or loss of life**. Do not proceed beyond a warning note until the indicated conditions are fully understood and met.

Dénote un risque: il attire l'attention sur une opération qui, si elle n'est pas faite ou suivi correctement, pourrait causer des blessures ou un danger de mort. Ne pas dépasser une telle note avant que les conditions requises soient totallement comprises et accomplies.

CAUTION:

Denotes a hazard. It calls attention to a procedure that, if not correctly performed or adhered to, could result in **damage or destruction of the product**. Do not proceed beyond a caution sign until the indicated conditions are fully understood and met.

Dénote un risque: il attire l'attention sur une opération qui, si elle n'est pas faite ou suivi correctement, pourrait causer un dommage ou destruction de l'équipement. Ne pas dépasser une telle note avant que les conditions requises soient totallement comprises et accomplies.

NOTE:

Denotes additional information about the current subject.

IMPORTANT SAFETY FEATURE:

Denotes information about safety issues.

IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS

WARNING!

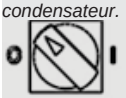
RISK OF ELECTRIC SHOCK AND FIRE. Use this inverter only with PV modules with a maximum system voltage rating of 600V or higher.

RISQUE DE CHOC ELECTRIQUE ET D'INCENDIE. Utilisez cet onduleur seulement avec des modules PV spécifiés pour une tension de système maximum de 600V ou plus.

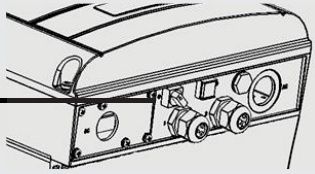
WARNING!

The cover must be opened only after shutting off the inverter ON/OFF switch located at the bottom of the inverter. This disables the DC voltage inside the inverter. Wait five minutes before opening the cover. Otherwise, there is a risk of electric shock from energy stored in the capacitors.

Ne pas ouvrir le couvercle de l'onduleur avant d'avoir coupé l'interrupteur CA/CC situé en dessous de l'onduleur. Cela supprime les tensions CC et CA de l'onduleur. Attendre que le LCD affiche une tension sécurisée (50V). Si l'affichage LCD n'est pas visible, attendre cinq minutes avant d'ouvrir le couvercle. Sinon, il y a un risque de choc électrique provenant de l'énergie stockée dans le condensateur.



Inverter ON/OFF switch
0=OFF
1=ON



WARNING!

Before operating the inverter, ensure that the inverter is grounded properly.

Avant d'utiliser l'onduleur monophasé, assurez-vous que l'onduleur est correctement mis à la terre.

WARNING!

Opening the inverter and repairing or testing under power must be performed only by qualified service personnel familiar with this inverter.

L'unité ne doit être ouverte que par un technicien qualifié dans le cadre de l'installation et de la maintenance.

WARNING!

The supplied AC/DC Safety Switch meets all requirements for a code-compliant installation of this ungrounded system. The DC section disconnects both the positive and negative conductors.

Le sectionneur CA/CC externe (inclus) repond aux exigences de conformité pour l'installation de ce système non-relié à la terre. Le coupeur CC ouvre les conducteurs positifs et négatifs.

WARNING!

The single phase 3-6 kW and the three phase inverters must be connected only to a dedicated AC branch circuit with a maximum Overcurrent Protection Device (OCPD) of 40 A.

The single phase 7.6-11.4 kW inverters must be connected only to a dedicated AC branch circuit with a maximum Overcurrent Protection Device (OCPD) of 60A.

Les onduleurs monophasé 3-6kW et triphasés doivent être connectés uniquement à un branchement AC dédié avec un disjoncteur de 40A.

L'onduleur monophasé 7.6-11.4kW et triphasés doivent être connectés uniquement à un branchement AC dédié avec un disjoncteur de 60A..

WARNING!

The inverter input and output circuits are isolated from the enclosure. This system does not include an isolation transformer and should be installed with an ungrounded PV array in accordance with the requirements of NEC Articles 690.35 and 690.43 National Electric Code, ANSI/NFPA 70, 2011 (and Canadian Electrical Code, Part I, for installations in Canada).

Equipment grounding is the responsibility of the installer and must be performed in accordance with all applicable Local and National Codes.

Les circuits d'entrée et de sortie de l'onduleur sont isolés de l'enveloppe. Ce système n'inclut pas d'isolation galvanique (transformateur) et devra être installé sans mise à la terre du champ PV et en accord avec les articles 690.35 et 690.43 du National Electric Code (NEC), ANSI/NFPA 70, 2011 (et du Code Electrique Canadien, Partie 1, pour les installations faites au Canada).

La mise à la terre des équipements est la responsabilité de l'installateur et doit être faite en accord avec les toutes les règles locales et nationales applicables.

CAUTION!

This unit must be operated under the specified operating specifications, as described in the latest technical specification datasheet, available on the SolarEdge website at http://www.solaredge.us/groups/products/overview.

NOTE:

For single-phase inverters, use only copper conductors rated for a minimum of 75°C.

For three-phase inverters, use only copper conductors rated for a minimum of 90°C.

For three-phase inverters where opposite polarity DC conductors are routed in the same conduit, 1000V rated cables must be used.

NOTE:

This inverter is provided with an IMI (Isolation Monitor Interrupter) for ground fault protection.

NOTE:

The ⏚ symbol appears at grounding points on the SolarEdge equipment. This symbol is also used in this manual.

Chapter 1: Introducing the SolarEdge System

System Overview

The SolarEdge power harvesting solution maximizes the power output from any type of solar Photovoltaic (PV) installation while reducing the average cost per watt. The following sections describe the system components.

SolarEdge Power Optimizer

SolarEdge power optimizers are DC-DC converters connected to PV modules in order to maximize power harvesting by performing independent Maximum Power Point Tracking (MPPT) at the module level.

The power optimizers regulate the string voltage at a constant level, regardless of string length and environmental conditions.

The power optimizers include a safety voltage function that automatically reduces the output of each power optimizer to 1 Vdc in the following cases:

- During fault conditions
- The power optimizers are disconnected from the inverter
- The inverter's ON/OFF switch is turned OFF
- The AC/DC Safety Switch is turned OFF
- Inverter's AC breaker is turned OFF

Each power optimizer also transmits module performance data over the DC power line to the inverter.

Two types of power optimizers are available:

- Module Add-on power optimizer – connected to one or more modules
- Module embedded power optimizer – are embedded into a module

SolarEdge Inverter with AC/DC Safety Switch

The SolarEdge inverter efficiently converts DC power from the modules into AC power that can be fed into the main AC service of the site and from there to the grid. The inverter also receives the monitoring data from each power optimizer and transmits it to a central server (the SolarEdge monitoring portal; requires Internet connection).

The AC/DC Safety Switch is a manually operated switch for disconnecting the AC and DC power of a SolarEdge system.

The AC/DC Safety Switch is located below the inverter and is connected to the inverter with AC and DC wires.

SolarEdge Monitoring Portal

The SolarEdge monitoring portal enables you to monitor the technical and financial performance of one or more SolarEdge sites. It provides past and present information on the system performance both at the system and module levels.

Supported AC Grids

The following sections show the AC grids supported by the SolarEdge inverters.

Grids Supported by the Single Phase Inverters

The following figure illustrates grids that are supported, and detected automatically by the default grid setting (set to Auto when setting the country and grid. Refer to *Country and Grid* on page 45). Note that for auto-detection, the neutral wire must be connected.

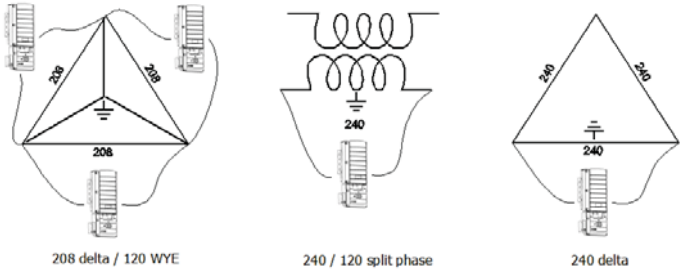


Figure 1: Auto-detected AC grids supported by SolarEdge single phase

The following figure illustrates grids that are supported; however require changing the grid settings (Refer to *Country and Grid* on page 45). Note that in some cases L1 and L2 are not interchangeable. In these places, L1 and L2 locations appear in the in the drawing.

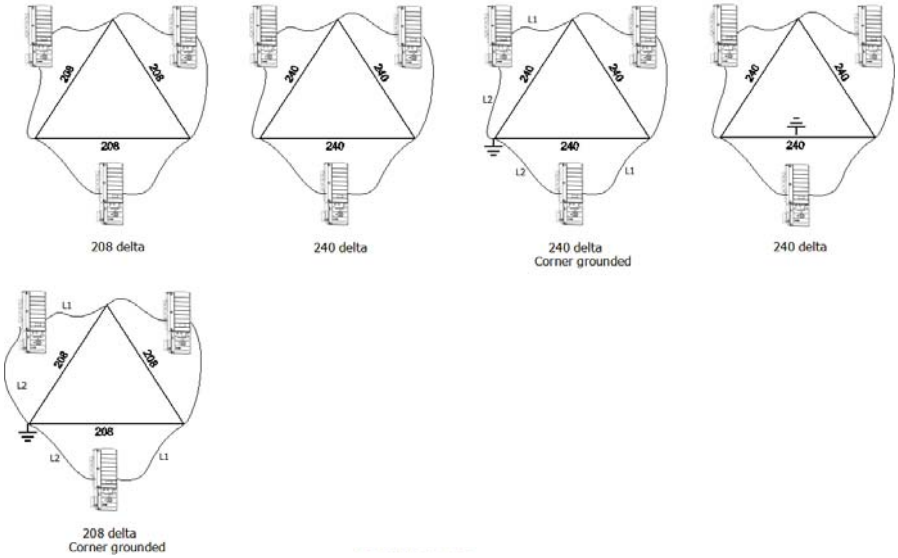


Figure 2: AC grids supported by SolarEdge single phase inverters

Grids Supported by the Three Phase Inverters

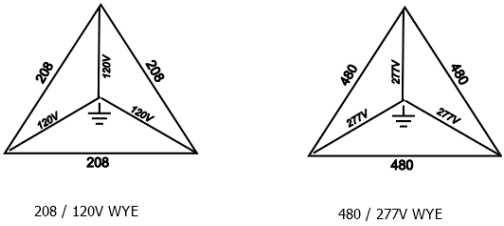
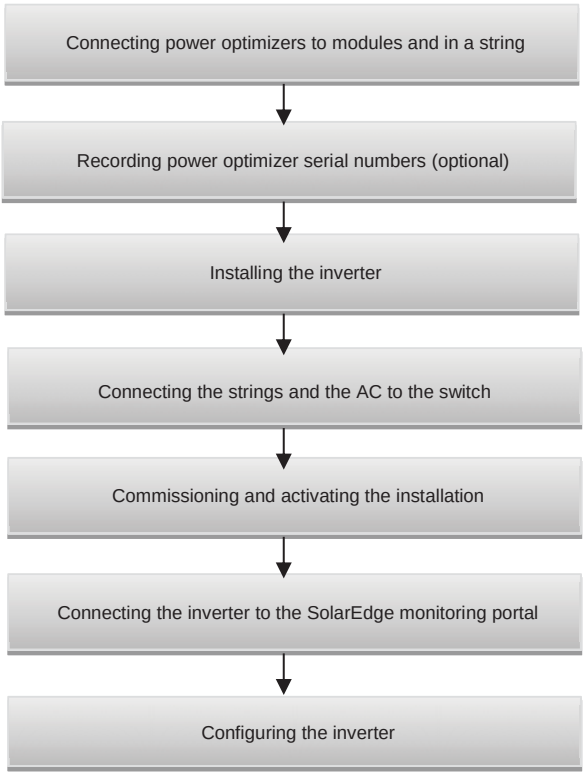


Figure 3: AC grids supported by SolarEdge three-phase inverters

Installation Procedure

The following is the procedure for installing and setting up a new SolarEdge site. Many of these also apply to modification of an existing site.


Connecting power optimizers to modules and in a string
Recording power optimizer serial numbers (optional)
Installing the inverter
Connecting the strings and the AC to the switch
Commissioning and activating the installation
Connecting the inverter to the SolarEdge monitoring portal
Configuring the inverter

Page 13
Pages 18
Page 21
Pages 30- 33
Page 35
Page 38
Page 41

Installation Equipment List

Standard tools can be used during the installation of the SolarEdge system. The following is a recommendation of the equipment needed for installation:

- Allen screwdriver for 5mm screw type for the inverter cover and AC/DC Safety Switch cover
- Allen screwdriver for 5mm screw type for the inverter side screw
- Standard flat head screwdrivers set
- Non-contact voltage detector
- Cordless drill or screwdriver and bits suitable for the surface on which the inverter will be installed and for opening the AC/DC Safety Switch knockouts
- Suitable hardware for attaching the inverter mounting bracket to the surface to which it will be connected
- 1/4" or 5/16" stainless bolts, nuts, and washers (and an Allen screwdriver) for attaching the power optimizer to the racking
- Wire cutters
- Wire strippers
- Voltmeter

For installing the communication options, you may also need the following:

- For Ethernet:
  - CAT5/6 twisted pair Ethernet cable with RJ45 connector
  - If using a CAT5/6 cable spool: RJ45 plug and RJ45 crimper
- For RS485:
  - Four- or six-wire twisted pair
  - Watchmaker precision screwdriver set

Inverter Transport and Storage

Transport the inverter in its original packaging, standing up and without exposing it to unnecessary shocks. If the original package is no longer available, use a similar box which can withstand the weight of the inverter (refer to the inverter weight in *Appendix B: Technical Specifications* on page 72), has a handle system and can be closed fully.

Store the inverter in a dry place where ambient temperatures are -13°F - 140°F/ -25°C - +60°C.

Chapter 2: Installing the Power Optimizers

Safety

The following notes and warnings apply when installing the power optimizers:

WARNING!

When modifying an existing installation, turn OFF the inverter ON/OFF switch, the AC/DC Safety Switch and the AC switch of the distribution panel.

Avant de faire ces étapes, éteignez l'onduleur monophasé en mettant sur OFF l'interrupteur ON/OFF situé au bas de l'onduleur.

WARNING!

Input and output connectors are not watertight until mated. Open connectors should be mated to each other or plugged with appropriate watertight caps.

Les connecteurs d'entrée et sortie ne sont pas étanches jusqu'à ce qu'ils soient accouplés. Les connecteurs doivent être accouplés ou fermés avec des terminaux étanches.

CAUTION:

This unit must be operated according to the operating specifications in this document.

Cette unité doit être opérée suivant les instructions trouvées dans ce document.

CAUTION:

Cutting the power optimizer input or output cable connector is prohibited and will void the warranty.

Sectionner les cables d'entrées ou de sortie de l'optimiseur est interdit et annule sa garantie.

CAUTION:

Power optimizers are IP65/NEMA4 rated. Choose a mounting location where optimizers will not be submerged in water.

Les optimiseurs de puissances sont compatibles à la norme IP65/NEMA4. Choisissez le lieu de montage tel que l'optimiseur ne puisse pas être submergé par l'eau.

CAUTION:

If you intend to mount the optimizers directly to the module or module frame, first consult the module manufacturer for guidance regarding the mounting location and the impact, if any, on module warranty. Drilling holes in the module frame should be done according to the module manufacturer instructions.

Pour installation à même le module ou la monture du module, consultez d'abord le fabricant du module sur la position et son impact sur la garantie du module. Le perçage de trous dans le cadre du module devra se faire suivant les instructions du fabricant.

CAUTION:

Installing a SolarEdge system without ensuring compatibility of the module connectors with the optimizer connectors may be unsafe and could cause functionality problems such as ground faults, resulting in inverter shut down.

In order to ensure mechanical compatibility of the SolarEdge optimizers and the modules to which they are connected:

- Use identical connectors from the same manufacturer and of the same type on both the power optimizers and on the modules; or
- Verify that the connectors are compatible in the following way:
  - The connector manufacturer should explicitly verify compatibility with the SolarEdge optimizer connector; and
  - A third-party test report by one of the listed external labs (TUV, VDE, Bureau Veritas UL, CSA, InterTek) should be obtained, verifying the compatibility of the connectors.

Les connecteurs du module doivent être mécaniquement compatibles avec les optimiseurs de puissance. Sinon, le système SolarEdge installé peut être dangereux ou causer des problèmes fonctionnels, tels que les défauts de terre, qui peuvent provoquer un arrêt de l'onduleur.

Afin d'assurer la compatibilité mécanique entre les optimiseurs de puissance SolarEdge et les modules auxquels ils sont connectés, il faut :

- *Utiliser des connecteurs identiques du même fabricant et du même type aussi bien pour les optimiseurs de puissance que pour les modules.*
- *Vérifiez que les connecteurs sont compatibles de la manière suivante:*
  - *Le fabricant du connecteur doit explicitement vérifier la compatibilité avec le connecteur SolarEdge.*
  - *Un rapport de test de tierce partie doit être effectué par l'un des laboratoires externes indiqués ci-dessous:(TUV, VDE, Bureau Veritas UL, CSA,Intertek), qui vérifiera la compatibilité des connecteurs.*

IMPORTANT SAFETY FEATURE:

Modules with SolarEdge power optimizers are safe. They carry only a low safety voltage before the inverter's ON/OFF switch is turned ON. As long as the power optimizers are not connected to the inverter or the inverter is turned OFF, each power optimizer will output a safe voltage of 1V.

Package Contents

- Power optimizers
- Stainless steel grounding lock washers

Installation Guidelines

- This chapter refers only to the module add-on power optimizers. For module-embedded models, refer to the installations instructions supplied with the embedded module.
- The power optimizer can be placed in any orientation.
- Position the power optimizer close enough to its module so that their cables can be connected.
- To allow proper heat dissipation, maintain a 1" (2.5 cm) clearance distance between the power optimizer and other surfaces.
- The minimum and maximum string length guidelines are stated in the power optimizer datasheets.
- Refer to the SolarEdge Site Designer for string length verification. The SolarEdge Site Designer is available on the SolarEdge website at http://www.solaredge.us/groups/support/downloads, under Software Tools.
- Completely shaded modules may cause their power optimizers to temporarily shut down. This will not affect the performance of the other power optimizers in the string, as long as the minimum number of unshaded power optimizers connected in a string of modules is met. If under typical conditions fewer than the minimum optimizers are connected to unshaded modules, add more optimizers to the string.
- Do not leave the power optimizers connectors disconnected. Open connectors should be mated to each other.
- Equipment grounding tightening torques: 4-6 AWG: 45 lb-in, 8 AWG: 40 lb-in, 10-14 AWG: 35 lb-in.

NOTE:

The images contained in the following sections are for illustrative purposes only and may vary depending on product models.

Step 1, Mounting and Grounding the Power Optimizers

1. Determine the power optimizer mounting location and use the power optimizer mounting brackets to attach the power optimizer to the support structure, (see Figure 4). For optimizers supplied with module frame-specific brackets, attach the power optimizer to the module frame following the instructions included with the optimizers.

2. If required, mark the mounting holes locations and drill the holes.

CAUTION:

Do not drill through the power optimizer or through the mounting holes. The drilling vibrations can damage the power optimizer and will void the warranty.

Ne pas percer à travers la optimiseur de puissance ou ses trous de fixation. Les vibrations qui en résulteraient peuvent endommager la optimiseur de puissance.

3. Attach each power optimizer to the rack using the 5/16'' or 1/4'' stainless steel bolts, nuts and washers. For 3NA series power optimizers, SolarEdge recommends mounting the power optimizer on a rail with the smooth side facing out, so that the power optimizer's body will prevent its rotation.

4. Use the following methods to ground the power optimizer[1]:

WARNING!

The metallic enclosure of the power optimizer must be grounded in accordance with the requirements of the local and national codes.

L'enceinte métallique de l'optimiseur de puissance doit être mise à la terre en accord avec les régulations locales et nationales.

- **For mounting on a grounded metal rail**: Use the provided 5/16'' stainless steel grounding star washer between the railing and the flat side of the mounting bracket.
  The grounding washer should break through the anodize coating of the railing to ensure low-resistive connection. Apply torque of 9.5 N*m / 7 lb*ft.

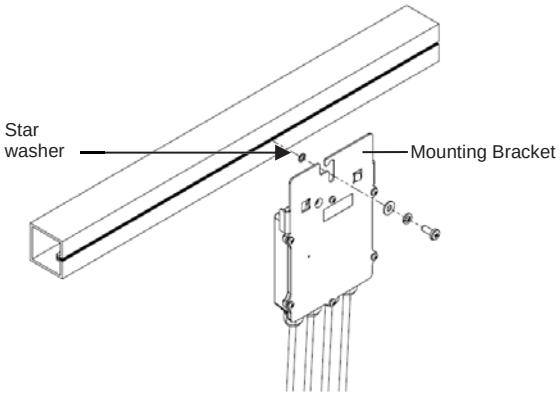


Figure 4: Power optimizer installation and grounding using the star washer

[1] For a list of racking models and their appropriate grounding method, refer to http://www.solaredge.us/files/pdfs/grounding_se_power_optimizers.pdf.

- **For mounting on rails with sliding nut fasteners, or an un-grounded structure** (such as a wooden structure): Connect an equipment-grounding conductor to the grounding terminal according to the instructions supplied with the grounding terminals (grounding terminal kits are available from SolarEdge). The grounding terminal accepts a wire size of 6-14 AWG, and must be sized for equipment grounding per NEC 250.122 requirements. Tighten the screws connecting the power optimizer to the frame and the grounding terminal screw. Apply torque of 9.5 N*m / 7 lb*ft.

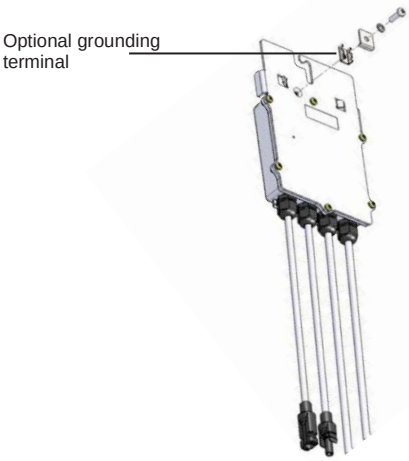


Figure 5: Power optimizer grounding terminal

5 Verify that each power optimizer is securely attached to the supporting structure or the module.

NOTE:

Record power optimizer serial numbers and locations, as described in *Providing Installation Information* on page 39.

Step 2, Connecting a Module to a Power Optimizer

- Connect the Plus (+) output connector of the module to the Plus (+) input connector of the power optimizer.
- Connect the Minus (-) output connector of the module to the Minus (-) input connector of the power optimizer.

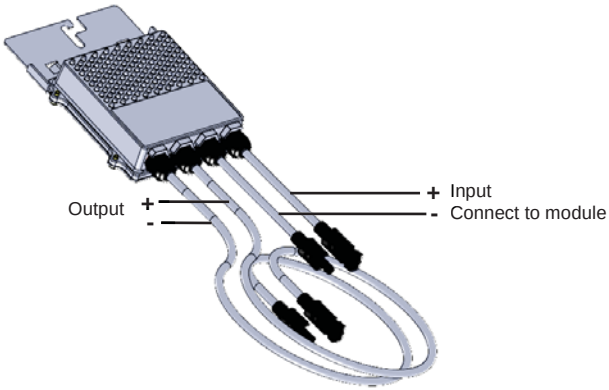


Figure 6: Power optimizer connectors

Step 3, Connecting Power Optimizers in Strings

You can construct parallel strings of unequal length, that is, the number of power optimizers in each string does not have to be the same. The minimum and maximum string lengths are specified in the power optimizers' datasheets. Refer to the SolarEdge Site Designer for string length verification.

NOTE:

String length should not exceed 1000ft. (300m) from DC+ to DC- of the inverter. Use at least 11 AWG/ 4 mm² DC cables.

1. Connect the Minus (-) output connector of the string's first power optimizer to the Plus (+) output connector of the string's second power optimizer.
2. Connect the rest of the power optimizers in the string in the same manner.

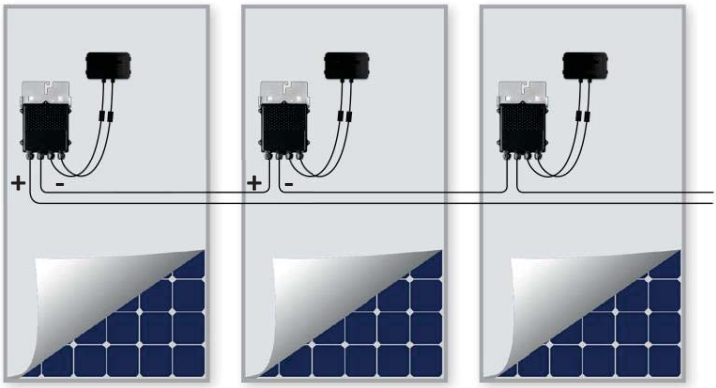


Figure 7: Power optimizers connected in series

3. If you intend to monitor the installation, using the SolarEdge monitoring portal, record the physical location of each power optimizer, as described in *Providing Installation Information* on page 39.

CAUTION:

Do not leave the power optimizers connectors disconnected. Open connectors should be mated to each other.

Ne pas laisser les connecteurs d'optimiseurs de puissance découverts et déconnectés. Les connecteurs ouverts doivent être accouplés les uns aux autres.

Step 4, Verifying Proper Power Optimizer Connection

After a module is connected to a power optimizer, the power optimizer outputs a safe voltage of 1V. Therefore, the total string voltage should be equal to 1V times the number of power optimizers connected in series in the string. For example, if 10 power optimizers are connected in a string, then 10V should be produced.

- Make sure the modules are exposed to sunlight during this process; otherwise, the power optimizers may not be powered. If you use a tracker, the power optimizer will turn ON only if the tracker is tracking the sun and the module provides at least 2W.

- In SolarEdge systems, due to the introduction of power optimizers between the PV modules and the inverter, the short circuit current I_{SC} and the open circuit voltage V_{OC} hold different meanings from those in traditional systems. For more information about the SolarEdge systems' string voltage and current, refer to the *V_{OC} and I_{SC} in SolarEdge Systems Technical Note*, available on the SolarEdge website at http://www.solaredge.us/files/pdfs/Voc_and_Isc_in_solaredge_sytems_technical_note.pdf
- Isolation measurement using a 600V measurement device is also possible.

To verify proper power optimizers connection:

Measure the voltage of each string individually before connecting it to the AC/DC Safety Switch (or to a combiner box). Verify correct polarity by measuring the string polarity with a voltmeter. Use a voltmeter with at least 0.1V measurement accuracy.

For troubleshooting power optimizers operation problems, refer to *Power Optimizer Troubleshooting* on page 71.

Chapter 3: Installing the Inverter

Install the inverter either before or after the modules and power optimizers have been installed.

NOTE:

For single-phase 3-6kW inverters, use only copper conductors rated for a minimum of 75°C.

For single phase 7.6-11.4kW inverters and for three-phase inverters, use only copper conductors rated for a minimum of 90°C.

For three-phase inverters where opposite polarity DC conductors are routed in the same conduit, 1000V rated cables and components must be used.

Inverter Package Contents

- One SolarEdge inverter
- One mounting bracket
- Two Allen screws for fastening the inverter to the mounting bracket
- This installation guide
- Quick installation guide
- Inverter activation instructions (may include an activation card)

Identifying the Inverter

Refer to the sticker on the inverter that specifies its **Serial Number** and its **Electrical Ratings**. Provide the serial number when contacting SolarEdge support. The serial number is also required when opening a new site in the SolarEdge monitoring portal.

In the following sections, unless otherwise indicated, instructions apply to both single-phase and three-phase inverters, though only one graphical example may be presented.

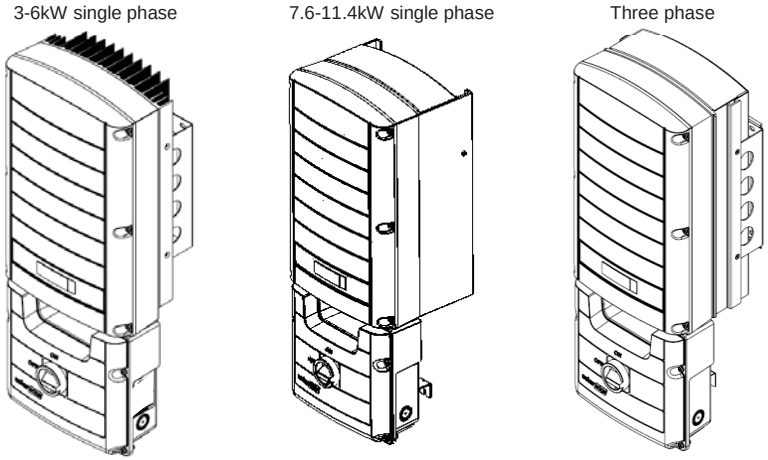


Figure 8: Single phase and three phase inverters

Inverter Interfaces

The following shows the inverter connectors and components, located at the bottom of the inverter:

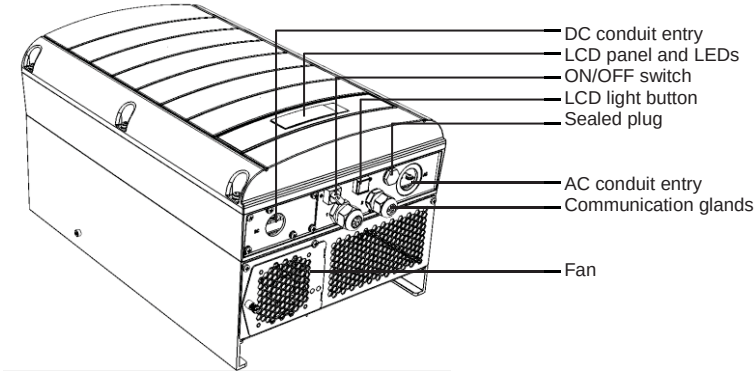


Figure 9: Inverter Interfaces (three phase and single phase 7.6-11.4 kW example)

- **LCD panel**: displays inverter information and configuration parameters
- **LCD LEDs**: Three LEDs indicate the following inverter statuses:

Color	Description	Functionality
Green	Power production	**On** - The inverter is producing power. Blinking - Standby mode. The inverter is in Standby mode until its working voltage is reached. The inverter then enters Production mode and produces power. **Off** - The inverter is not producing power. This may be during Night mode, when the inverter ON/OFF switch is OFF or when an error occurs.
Yellow	Module communication and inverter shutdown	Blinking: ▪ Monitoring information is being received from a power optimizer. ▪ The inverter is being shut down.
Red	Fault	**On** - There is an error. Refer to *Appendix A: Errors and Troubleshooting* on page 63 for more information. **Blinking** - The inverter is being shut down.

All LEDs turn on while the inverter is being configured.

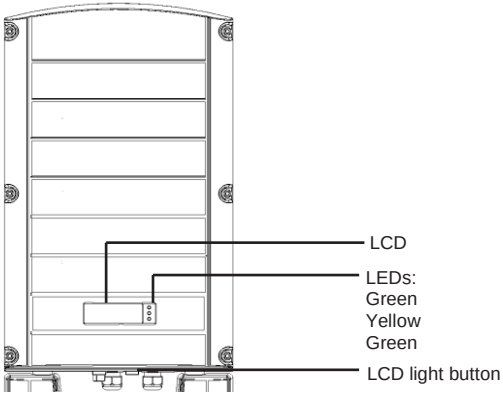


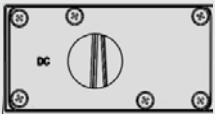
Figure 10: Inverter front view

- **AC and DC conduit entries**: Connection points of the AC/DC Safety Switch

CAUTION:

Do not remove the six screws on the DC conduit metal panel as it may harm the inverter sealing and void the warranty.

Ces vis ne doivent pas être retirées. Les enlever est susceptible d'endommager l'étanchéité de l'onduleur et annuler la validité de la garantie.



- **ON/OFF switch:** Turning this switch ON starts the operation of the power optimizers, enables power production and allows the inverter to begin exporting power to the utility grid. Turning it OFF reduces the power optimizer voltage to a low safety voltage and inhibits exportation of power. When this switch is OFF, the inverter control circuitry remains powered up.
- **LCD light button:** Pressing this button lights up the LCD for 30 seconds. In addition, you can press this button to access configuration menu options, as described on page 43.
- Two **communication glands**, for connection of inverter communication options. Each gland has three openings. Refer to *Chapter 7: Setting Up Communication* on page 54 for more information.

Opening Conduit Knockouts

This step may be performed after mounting the inverter.

1 Move the AC/DC Safety Switch and the inverter ON/OFF switch to OFF.

NOTE:

When the AC/DC Safety Switch is OFF (for example during maintenance) it may be locked to prevent safety hazard:

1. Move the AC/DC Safety Switch to the Lock position.
2. Insert the lock through the knob opening and lock.

2 Loosen the screws on the front cover of the AC/DC Safety Switch, as shown below:

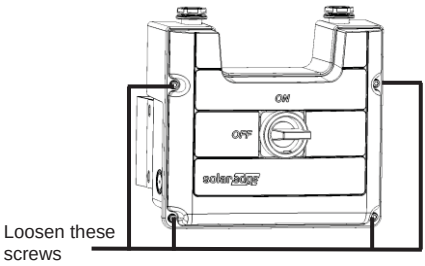


Figure 11: Opening the AC/DC Safety Switch cover

3 Remove the AC/DC Safety Switch cover.

4 Open the AC and DC conduit knockouts: The switch has knockouts located at the bottom, back and sides of the enclosure, each with two sizes: ¾'' and 1''. Open the necessary pair according to the conduits used in the installation, taking care not to interfere with any of the internal components. A Unibit drill may be used.

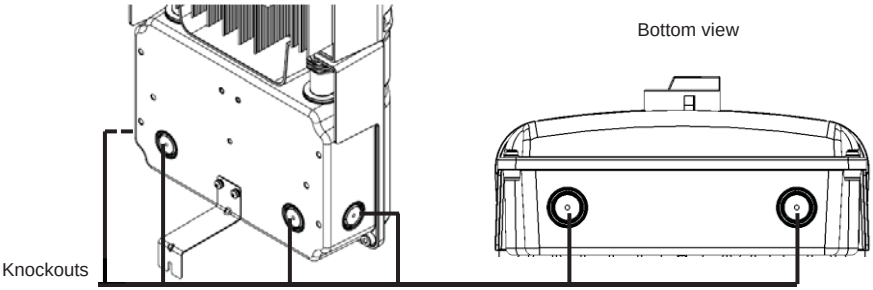


Figure 12: AC/DC Safety Switch knockouts

Mounting the Inverter

The inverter is supplied with one of the following two types of mounting brackets.

The mounting steps in the next sections refer to these types.

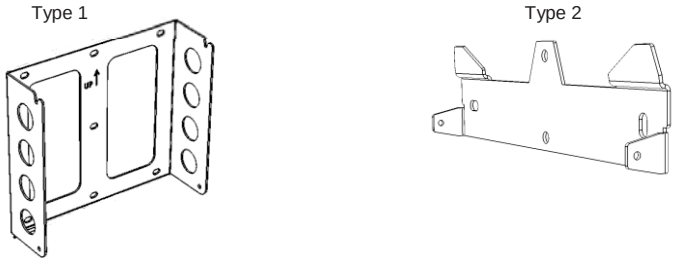


Figure 13: Mounting bracket types

NOTE:

Make sure the mounting surface or structure can support the weight of the inverter and bracket.

CAUTION:

HEAVY OBJECT. To avoid muscle strain or back injury, use proper lifting techniques, and if required - a lifting aid when removing or replacing.

Objet lourd. Pour éviter la fatigue musculaire ou des blessures au dos, utilisez des techniques de levage appropriées et, si nécessaire - un auxiliaire de levage lors du retrait ou du remplacement.

1 Determine the inverter mounting location, on a wall, stud framing or pole, as follows:

- To allow proper heat dissipation, maintain the following minimum clearance areas between the inverter and other objects:
  - 8" (20 cm) to the top of the inverter
  - At least 4" (10 cm) to the bottom of the inverter; if conduit entry to the AC/DC Safety Switch will be from the bottom leave sufficient clearance for the conduits as well.
  - 4" (10 cm) to the right and left of the inverter. For easy access to the fans (single phase 7.6-11.4 kW and the three phase inverters), you may leave larger clearance.
  - When installing inverters side by side, leave at least 16" (40 cm) between inverters
  - When installing inverters one above of the other, leave at least 16" (40 cm) between inverters.
- Position the mounting bracket against the wall/pole and mark the drilling hole locations (refer to *Inverter and Mounting Bracket Dimensions* on page 80):
  - For Type 1 - Ensure that the U-shaped indentations are facing up and the “UP” marking is correctly oriented, as shown below:

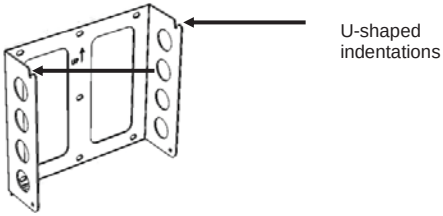


Figure 14: Bracket with U-shaped indentations facing up

- For Type 2 – Ensure that the flat side of the bracket is at the bottom, as in Figure 13.
- Use at least two bracket holes. Additional holes can be used to fix the bracket. Determine which and how many holes to use according to mounting surface type and material.

2 Drill the holes and mount the bracket. Verify that the bracket is firmly attached to the mounting surface.

3 Hang the inverter on the bracket (Figure 15 and Figure 16): Lift the inverter from the sides, or hold it at the top and bottom of the inverter to lift the unit into place. Do not lift holding the AC/DC Safety Switch as it may be damaged.

- For Type 1 - Use the screws at the top of the inverter, as shown below. Let the inverter lay flat against the wall or pole.

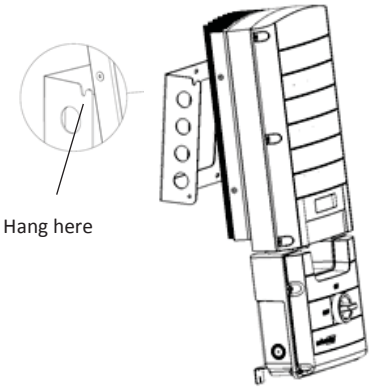


Figure 15: Hanging the inverter on the bracket - Type 1

- For Type 2 - Align the two indentations in the inverter enclosure with the two triangular mounting tabs of the bracket, and lower the inverter until it rests on the bracket evenly.

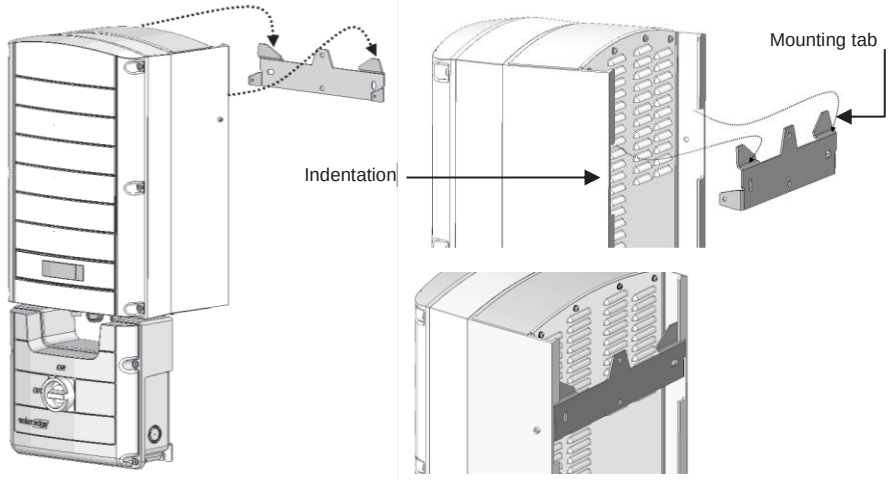


Figure 16: Hanging the inverter on the bracket - Type 2

4 Optionally, secure the AC/DC Safety Switch bracket to the wall:

- Mark the location of the bracket screw for the AC/DC Safety Switch and drill the hole.

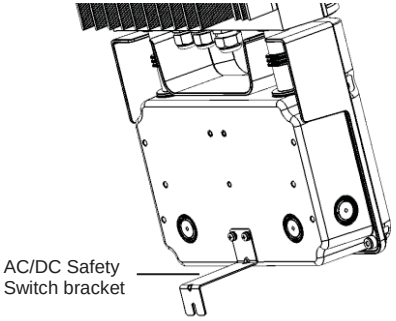


Figure 17: AC/DC Safety Switch bracket

- Fasten the bracket using a standard bolt.

Verify that the bracket is firmly attached to the mounting surface.

5 Insert the two supplied screws through the outer heat sink fin on both sides of the inverter and into the bracket. Tighten the screws with a torque of 4.0 N*m / 2.9 lb.*ft.

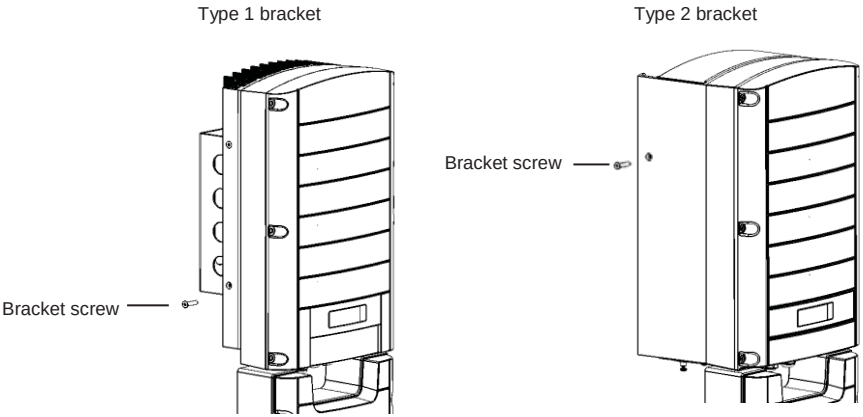


Figure 18: Inserting the bracket screws

Chapter 4: Connecting the AC and the Strings to the AC/DC Safety Switch

The AC/DC Safety Switch disconnects all ungrounded conductors of the circuit to which it is connected in compliance with the National Electric Code, and specifically NEC690.35, which addresses ungrounded PV arrays. The AC/DC Safety Switch is rated to the maximum operating conditions of the inverter.

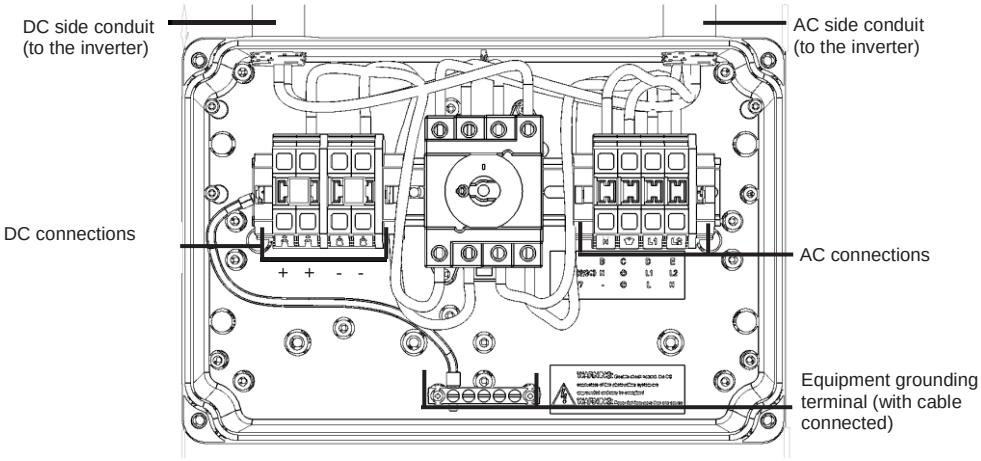


Figure 19: Inside the AC/DC Safety Switch for single phase 3-6kW inverters (DCD-1PH-US-C)

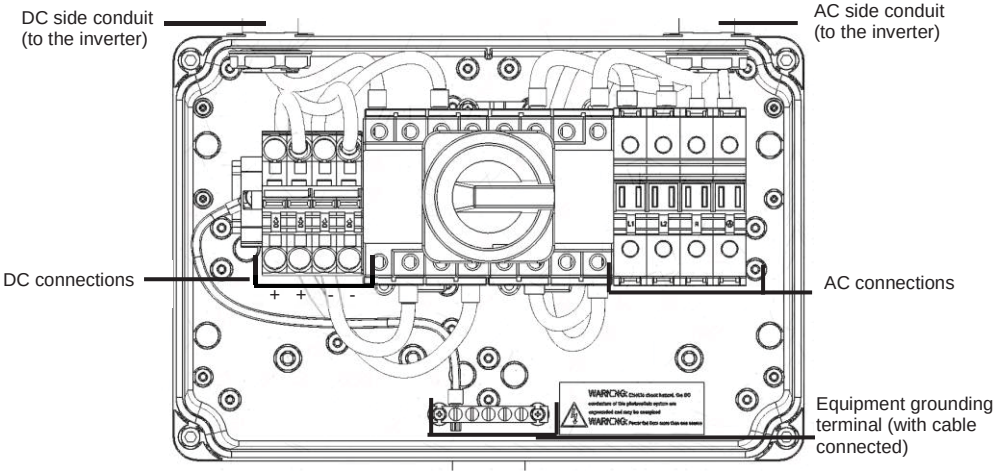


Figure 20: Inside the AC/DC Safety Switch for single phase 7.6-11.4 kW inverters (DCD-1PH-US-S2-A)

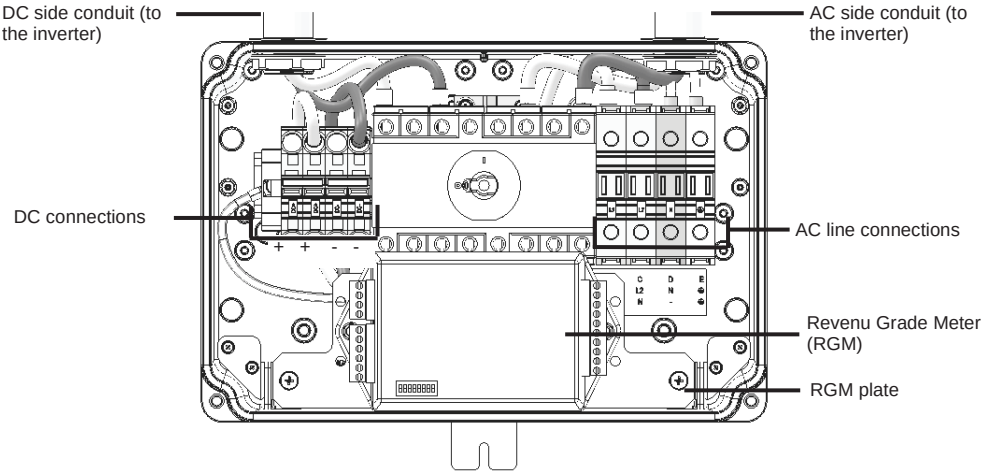


Figure 21: Inside the AC/DC Safety Switch for single phase inverters with a built-in revenue grade meter (RGM) (DCD-1PH-US-C-R and DCD-1PH-US-S2-A-R)

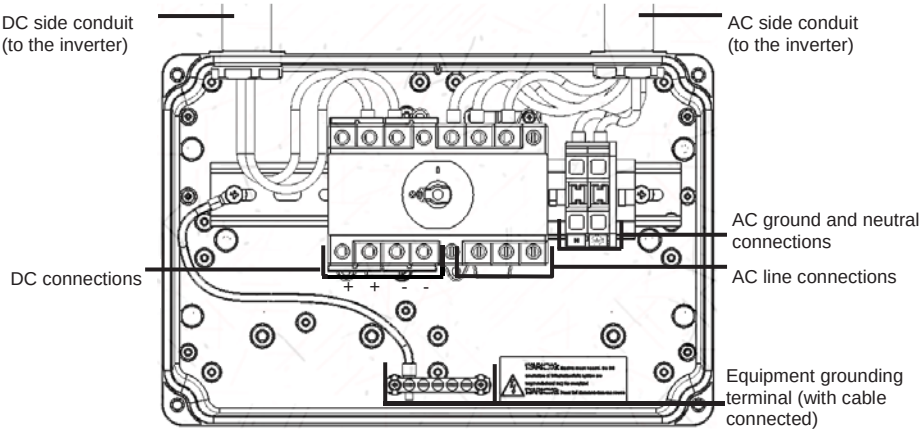

DC side conduit (to the inverter)
AC side conduit (to the inverter)
AC ground and neutral connections
DC connections
AC line connections
Equipment grounding terminal (with cable connected)

Figure 22: Inside the AC/DC Safety Switch for three phase inverters (DCD-3PH-US-S3-A)

Grid Connection Guidelines

NOTE:

Three phase inverters require neutral connection at all times (only WYE type grids with neutral connection are supported).

- In single phase inverters connected to corner grounded grids, connect the L2 terminal to the grounded conductor. When connecting to other grids, L1 and L2 are interchangeable.
- Equipment grounding tightening torques: 4-6 AWG: 45 lb-in, 8 AWG: 40 lb-in, 10-14 AWG: 35 lb-in.
- When connecting multiple single phase inverters in an installation connected to a three-phase grid, phase balancing may be required by the utility or grid operator. Phase balancing is supported in the SolarEdge inverters. For detailed information, refer to the *SolarEdge Phase Balancing Manual*, available on the SolarEdge website at http://www.solaredge.com/files/pdfs/phase_balancing_connection_guide.pdf.

NOTES:

- The conduits, hubs and fittings must be suited for field wiring systems.
- For three-phase inverters where opposite polarity DC conductors are routed in the same conduit, 1000V rated cables must be used.
- For single-phase inverters, use only copper conductors rated for a minimum of 75°C.
- For three-phase inverters, use only copper conductors rated for a minimum of 90°C.
- The hubs and other fittings must comply with UL514B.
- Use the conduit and wiring appropriate for the installation location per the NEC. Outdoor installations must use components that are rated NEMA 3R or higher.
- For more wiring information refer to *the SolarEdge Recommended AC Wiring Application Note*, available on the SolarEdge website at http://www.solaredge.us/files/pdfs/application-note-recommended-wiring.pdf

Connecting the AC Grid to the AC/DC Safety Switch

This procedure varies depending on the inverter type (single or three phase), and on the AC/DC Safety Switch model. Make sure you follow the procedure applicable to your equipment.

If the AC/DC Safety Switch has a pre-assembled RGM (see Figure 21), flip the RGM plate downwards before making the connections.

To connect the AC grid to the AC/DC Safety Switch – single phase 3-6kW inverters:

1. If supplied, remove the spring-clamp terminal instructions from inside the switch.
2. Strip $0\frac{5}{16}$'' (8mm) of the AC wire insulation.
3. Insert the AC conduit into the AC-side knockout that was opened.

WARNING!

Connect the equipment grounding before connecting the AC wires to the AC terminal block.

Veillez à relier le conducteur de PE (la terre) avant de connecter les fils CA au bornier CA.

4. Connect the wires to the appropriate terminal blocks, using the label located in the switch. Connect the grounding wire first.

	B	C	D	E
208/240	N	⏚	L1	L2
277	-	⏚	L	N

Figure 23: AC/DC Safety Switch AC terminal block label – single phase 3-6kW inverters

5 Use a standard flat-blade screwdriver to connect the wires to the spring-clamp terminals:
- The screwdriver blade should fit freely in the terminal opening. Too large a blade can crack the plastic housing.
- Insert the screwdriver and firmly tilt it to press the release mechanism and open the clamp.
- Insert the wire $0\frac{5}{8}$" (15mm) deep into the side opening.
- Remove the screwdriver – the wire is automatically clamped.

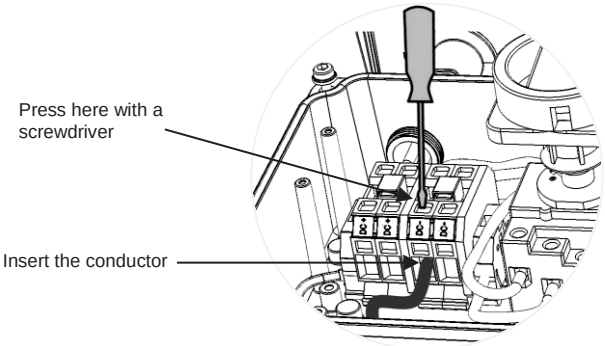


Figure 24: Spring-clamp terminal

6 Verify that there are no unconnected wires.

To connect the AC grid to the AC/DC Safety Switch – single phase 7.6-11.4 kW inverter:

1 If supplied, remove the spring-clamp terminal instructions from inside the switch.

2 Strip $1\frac{3}{8}$'' (35mm) of the AC wire insulation.

3 Insert the AC conduit into the AC-side knockout that was opened.

WARNING!

Connect the equipment grounding before connecting the AC wires to the AC terminal block.

Veillez à relier le conducteur de PE (la terre) avant de connecter les fils CA au bornier CA.

4 Connect the wires to the appropriate terminal blocks, using the label located in the switch. Connect the grounding wire first.

	B	C	D	E
208/240	L1	L2	N	⏚
277	L	N	-	⏚

Figure 25: AC/DC Safety Switch AC terminal block label –single phase 7.6-11.4 kW

5 Use a $0\frac{3}{16}$" (5mm) straight flat-blade screwdriver to connect the wires to the terminals:
- Insert the screwdriver into the top opening and rotate it counterclockwise to activate the clamp mechanism. The side latch holds the clamp in the open position.
- Insert the wire into the side opening as deep as possible.
- Slightly rotate the screwdriver counter-clockwise to release the latch.

- Remove the screwdriver – the wire is safely clamped.

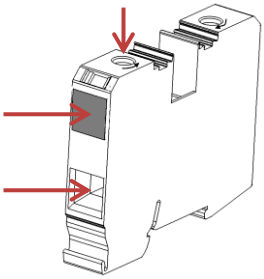


Figure 26: AC Spring-clamp terminal

6 Verify that there are no unconnected wires.

To connect the AC grid to the AC/DC Safety Switch – three phase inverter:

1 Strip $1\frac{3}{8}$'' (8 mm) of the AC wire insulation.

2 Insert the AC conduit into the AC-side knockout that was opened.

WARNING!

Connect the equipment grounding before connecting the AC wires to the AC.

Veillez à relier le conducteur de PE (la terre) avant de connecter les fils CA au bornier CA.

3 Connect the Ground and Neutral wires to the terminal blocks in the AC side of the switch (see Figure 22.)

4 Connect the line wires to the appropriate connectors, using the label located in the switch. Apply torque 2 N*m/ 1.47 ft.*lb.

-	L1	L2	L3

Figure 27: AC/DC Safety Switch AC label – three phase

Connecting the Strings to the AC/DC Safety Switch

Strings may be connected in parallel to the two DC input pairs of the switch. If more than two strings are required, they can be connected in parallel using an external combiner box before connecting to the switch. When connecting multiple strings, it is recommended to run separate circuits to the AC/DC Safety Switch or to position the combiner box near the switch. This simplifies commissioning by allowing testing and servicing near the inverter.

▶ To connect the strings to the AC/DC safety switch:

1. Strip $1\frac{3}{8}$'' (8 mm) of the DC wire insulation.
2. Insert the DC conduit into the DC-side knockout that was opened.
3. Equipment grounding: Connect the DC equipment ground conductor to the equipment grounding terminal block in the AC/DC safety switch.

NOTE:
Functional Electrical Earthing of DC-side negative or positive is prohibited because the inverter has no transformer. Earthing of module frames and mounting equipment (equipotential bonding) is required per NEC.

4. Connect the DC wires:

CAUTION:
Ensure that the Plus (+) wire is connected to the + terminal and that the Minus (-) wire is connected to the Minus (-) terminal connector.

Veillez à ce que le câble Plus (+) soit connecté au terminal + et que le câble - soit connecté au connecteur terminal.

NOTE:
If more than two strings are connected each should be properly fused on both DC+ and DC- according to NEC690.35(B).

NOTE:
SolarEdge's fixed input voltage architecture enables the parallel strings to be of different lengths. Therefore, they do not need to have the same number of power optimizers, as long as the length of each string is within the permitted range.

- *For single phase 3-6kW inverters* - Connect the DC wires from the PV installation to the DC+ and DC- terminal blocks, according to the labels on the terminals. Use a standard straight-bladed screwdriver to connect the wires to the spring-clamp terminals, as described for the AC connection (*To connect the AC grid to the AC/DC Safety Switch – single phase 3-6kW inverters:*, page 30).
- *For single phase 7.6-11.4kW inverters* - Connect the DC wires from the PV installation to the DC+ and DC- terminal blocks, according to the labels on the terminals:
  - Use a standard flat-blade screwdriver to connect the wires to the spring-clamp terminals. The screwdriver blade should fit freely in the terminal opening. Too large a blade can crack the plastic housing.
  - Insert the screwdriver and firmly tilt it to press the release mechanism and open the clamp.
  - Insert the wire into the top opening (see Figure 28).

- Remove the screwdriver – the wire is automatically clamped.

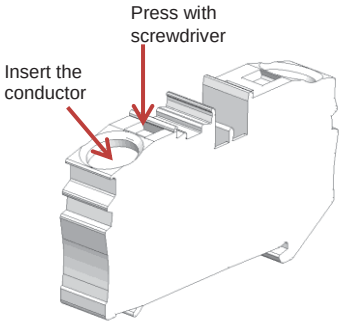


Figure 28: DC Spring-clamp terminal (single phase 7-11.4 kW inverter)

- *For three phase inverters* - Connect the DC wires from the PV installation to the DC+ and DC- terminals, according to the labels in the AC/DC Safety Switch.

5 If the AC/DC Safety Switch has a pre-assembled RGM, flip the RGM plate upwards to its original position.

6 Close the AC/DC switch cover: Attach the switch cover and secure it by tightening the four screws with a torque of 1.2 N*m / 0.9 ft.*lb.

Chapter 5: Commissioning the Installation

The following workflow describes how to activate the system, commission the installation and verify the proper functioning of the system.

Step 1, Activating the System

1. Verify that the inverter ON/OFF switch is OFF.
2. Turn ON the AC breaker.
3. Move the AC/DC Safety Switch to the ON position.
4. Remove the inverter cover: Open the inverter cover's six Allen screws and carefully pull the cover horizontally before lowering it.

WARNING!

ELECTRICAL SHOCK HAZARD. Do not touch uninsulated wires when the inverter cover is removed.

RISQUE D'ÉLECTROCUTION, ne touchez pas les fils non isolés lorsque le couvercle de l'onduleur est retiré

5. Activate the inverter according to the activation instructions supplied in the inverter package.
6. Verify that the inverter is configured to the proper country: Press the LCD light button until reaching the ID status screen:

```
ID:   ########   ##
DSP1/2:1.0210/1.0034
CPU:0002.0111
Country:USA2
```

7. If required, perform the following additional steps:
   - Country settings or inverter configuration using the internal LCD user buttons – refer to *Chapter 6: User Interface* on page 40.
   - Communication options connection – refer to *Chapter 7: Setting Up Communication* on page 54
8. Close the inverter cover by tightening the screws with a torque of 4.0 N*m/ 2.9 lb*ft. For proper sealing, first tighten the corner screws and then the two central screws.
9. Turn ON the AC/DC Safety Switch. If an additional external DC switch is installed between the power optimizers and the inverter(s) then turn it ON.
   A message similar to the following appears on the inverter LCD panel:

```
Vac[v]   Vdc[v]   Pac[w]
240.7      14.1      0.0
P_OK:   000/000   <S_OK>
                    OFF
```

10. Verify that the following information appears on the LCD panel:
    - **P_OK**: Appears only upon first telemetry reception from the power optimizers. Indicates connection with the power optimizers and that at least one power optimizer is sending monitoring data. If P_OK does not appear, check the power optimizer, string and DC input connections.
    - **000/000**: Appears only upon first telemetry reception from the power optimizers. Indicates the number of power optimizers that have been paired to this inverter. At this stage, the number should be 000, since no power optimizers have been paired.

- **S_OK:** the connection to the SolarEdge monitoring portal is successful (should appear only if the inverter is connected to the server). If S_OK is not displayed and the inverter is connected to the server, refer to *Appendix A: Errors and Troubleshooting* on page 63.
- **Vac [V]** - the grid's AC output voltage. Verify the correct value.
- **Vdc [V]** - the DC input voltage of the longest string connected to the inverter. There should be a safety voltage of 1V for each power optimizer in the string.

NOTE:
A measurement error on the inverter LCD of ± 3V is acceptable.

- **Pac [W]** - the AC output power. Should be **0.0** since the inverter is OFF.
- **OFF –** The inverter ON/OFF switch is in the OFF position.

Step 2, Pairing Power Optimizers to the Inverter

Once all connections are made, all the power optimizers must be logically paired to their inverter. The power optimizers do not start producing power until they are paired with an inverter. This step describes how to assign each inverter to the power optimizers from which it will produce power. Perform this step when the modules are exposed to sunlight.

1. Verify that the inverter ON/OFF switch is OFF.
2. Press and hold down the inverter LCD light button for about **10 seconds**. The following message is displayed:

```
Keep holding button
for pairing, release
to enter menu...
Remaining:      3 sec
```

Keep holding for 5 seconds until the following is displayed:

```
        Pairing
Turn Switch To On
```

3. Turn the inverter ON/OFF switch to ON **within 5 seconds**. If you wait longer than 5 seconds the inverter exits the pairing mode.
The following message is displayed indicating that the inverter is performing the pairing.

```
      Pairing
Remaining [sec]: 180
```

4. Wait for the completion of the pairing (remaining seconds is 0). If pairing fails, an error is displayed. In this case, repeat the pairing steps. If the problem persists, contact SolarEdge Support.
When pairing succeeds, the following message is displayed:

```
        Pairing
Pairing Completed
```

5. The system startup process begins:
   - Since the inverter is ON, the power optimizers start producing power and the inverter starts converting AC.

WARNING!
After you turn ON the inverter ON/OFF switch, the DC cables carry a high voltage and the power optimizers no longer output a safe 1V.

Après avoir mis l'interrupteur ON/OFF de l'onduleur monophasé sur ON, les câbles DC portent une haute tension et les optimiseurs de puissance ne génèrent plus la tension de sécurité de 1V.

- When the inverter starts converting power after the initial connection to the AC, the inverter enters Standby mode until its working voltage is reached. This mode is indicated by the flickering green inverter LED.
- While the inverter is in Standby mode, it monitors the grid and verifies correct grid voltage and frequency. The following message is displayed:

```
    Waking  Up...
Remaining:  051Sec
```

  The countdown indicates the seconds remaining until Production mode is entered. This time is in accordance with local regulations and is typically between three to five minutes.
- When countdown is complete, the inverter enters Production mode and produces power. This mode is indicated by the steadily lit green inverter LED.

Step 3, Verifying Proper Operation

After the wake-up time is over, a status screen similar to the following appears on the inverter LCD panel:

```
Vac[v]   Vdc[v]   Pac[w]
240.7    371.9    2349.3
P_OK:  XXX/YYY   <S_OK>
                   ON
```

1 Verify the following:

- The green inverter LED is steadily lit.
- The ON/OFF indicator on the LCD panel reads **ON**.
- **P_OK: XXX/YYY:** There is a connection to the power optimizers and at least one power optimizer is sending monitoring data. Optimizers send telemetries in a frequency of up to 10 minutes. Initially after pairing, both XXX and YYY values show 000 and the values increase as paired power optimizers are reported.

NOTE:

It can take up to 20 minutes for all power optimizers to transmit their telemetries and to be counted on the LCD screen.

- **S_OK** appears, if the inverter is connected to the SolarEdge monitoring portal.
- **Vac [V]** specifies the measured grid AC output voltage.
- **Vdc [V]** specifies the DC input voltage.
- **Pac [W]** specifies the **total** AC output power produced.

2 Take note of the serial # on the inverter label using the detachable 2D barcode sticker on each inverter. This information is used in the SolarEdge monitoring portal to identify this inverter and is needed to open a new site in the monitoring portal.

Your SolarEdge power harvesting system is now operational.

Step 4, Reporting and Monitoring Installation Data

NOTE:

This step requires connecting one of the communication options. Refer to *Chapter 7: Setting Up Communication* on page 54

The SolarEdge Monitoring System

The SolarEdge monitoring portal enables accessing SolarEdge site information, including up-to-date information viewed in a physical or logical view.

The monitoring portal is described in detail in the *SolarEdge Monitoring Portal User Guide,* available on the SolarEdge website at http://www.solaredge.com/files/pdfs/solaredge-monitoring-portal-user-guide.pdf.

The SolarEdge monitoring portal can display logical and physical layouts of the installed system, as follows:

- **Logical Layout:** Shows a schematic logical layout of the components in the system, such as: inverters, strings and modules, as well as their electrical connectivity. This view enables you to see which modules are connected in each string, which strings are connected to each inverter, and so on.
- **Physical Layout:** Shows a schematic physical layout of the components in the system, such as: inverters, clusters, strings and modules, as well as their electrical connectivity. This view enables a bird's eye view of the actual location of a system component.

Using the portal, you can:

- View the latest performance of specific components.
- Find underperforming components, such as modules, by comparing their performance to that of other components of the same type.
- Pinpoint the location of alerted components using the physical layout.
- See how components are connected to each other.
- Pair power optimizers remotely.

To display a logical layout, insert the serial numbers number in the new site created in the application. When the communication between the inverter and the monitoring server is established, the logical layout will be displayed.

To display a physical layout, you need to map the locations of the installed power optimizers. To generate a physical mapping, use either the iPhone Site Mapper application or a mapping template, which should be filled out using the detachable stickers (see *Providing Installation Information* on page 39).

The logical and physical mapping can be used for debugging a problem using the SolarEdge monitoring portal.

If you do not report the physical and logical mapping of the installed power optimizers to SolarEdge, the SolarEdge monitoring portal will show the logical layout indicating which power optimizers are connected to which inverters, but will not show strings or the physical location of power optimizers.

The inverter may be connected to the SolarEdge monitoring portal via LAN or via an external modem connected to the inverter RS232 connector. Alternatively, you can connect the inverter to another inverter that is already connected to the server, in a master-slave configuration. Refer to *Chapter 7: Setting Up Communication* on page 54.

Providing Installation Information

Paper Template

Fill out the Physical Layout Template using the detachable 2D barcode stickers on each power optimizer. Once the form is completed, scan it and upload the scanned file to the SolarEdge monitoring portal during site registration. For an example paper template, refer to http://www.solaredge.com/files/pdfs/physical-layout-template.pdf.

iPhone Site Mapper

Use the SolarEdge Site Mapper iPhone application to scan the power optimizer and inverter 2D barcodes. The application creates an XML file that can be uploaded to the SolarEdge monitoring portal during site registration. The SolarEdge Site Mapper can be downloaded from the Apple iTunes Store.

For detailed information, refer to the *SolarEdge Site Mapper Software Guide* or to the *Site Mapper demo movie,* available on the SolarEdge website at http://www.solaredge.com/groups/installer-tools/site-mapper.

Creating a Site in the SolarEdge Monitoring Portal

Create the site in the monitoring portal using the registration form available at the following link: http://www.solaredge.com/groups/site-registration. Fill out all required information in the form, which includes information about your installation, as well as details about its logical and physical mapping.

Chapter 6: User Interface

LCD User Buttons

Four buttons are located inside the inverter, above the LCD panel and are used for controlling the LCD menus, as shown below:

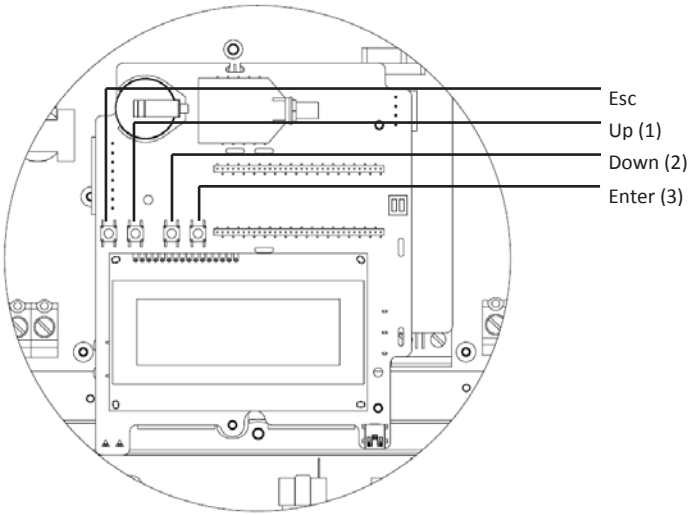


Figure 29: LCD internal user buttons

- **Esc:** Moves the cursor to the beginning of the currently displayed parameter; goes to the previous menu, and cancels a value change with a long press (until **Aborted** is displayed).
- **Up (1), Down (2):** Moves the cursor from one menu option to another, moves among the characters of a displayed parameter, and toggles between possible characters when setting a value.
- **Enter (3):** Selects a menu option and accepts a value change with a long press (until **Applied** is displayed).

Use the three rightmost buttons for entering 123 when entering the password.

The LCD panel and buttons may be used during the following:

- **Setup Mode:** After inverter installation, the field technician may perform basic inverter configuration, as described in *Configuring the Inverter Using the Internal LCD User* Buttons on page 41.
- **Operational Mode:** The LCD panel allows the user to check that the inverter is working properly. Refer to *Inverter Status Screens* on page 49 for a description of this option. Use the LCD light button to toggle through the informative displays.
- **Error messages:** In the event of a problem, an error message may be displayed on the LCD panel. Refer to *Appendix A: Errors and Troubleshooting* on page 63 and to *Configuring the Inverter Using the Internal LCD User Buttons* on page 41 for more information.

Inverter Configuration - Setup Mode

You can configure the inverter using one of the following:

- **The Internal LCD User Buttons** (page 41). When using this option, the inverter cover is removed.
- **The External LCD Light Button** (page 43). When using this option, removing the inverter cover is not required. This option of configuration includes a less detailed configuration menu.

Configuring the Inverter Using the Internal LCD User Buttons

After inverter installation, a field technician may perform basic inverter configuration.

1 Turn the inverter ON/OFF switch to OFF (AC/DC Safety Switch remains ON).

WARNING!

If the inverter is operating, the following message is displayed.

Si l'onduleur fonctionnait proprement avant cette opération, le message suivant est affiché:

```
DC  VOLTAGE  NOT  SAFE
 DO  NOT  DISCONNECT
    VDC:       72.0
```

This message is displayed until the DC voltage is safe (50V). Do not open the cover until the voltage is safe or until at least five minutes have passed.

Ce message est affiché jusqu'à ce que la tension DC soit sécurisée.

La tension de sécurité par défaut est de 50V.

Ne pas ouvrir le couvercle ou les connecteurs DC jusqu'à ce que la tension soit affichée comme sécurisé ou jusqu'à ce que cinq minutes au moins se soient écoulées.

2 Remove the inverter cover: Open the inverter cover's six Allen screws and carefully pull the cover horizontally before lowering it.

WARNING!

ELECTRICAL SHOCK HAZARD. Do not touch uninsulated wires when the inverter cover is removed.

3 Press the Enter button for at least 5 seconds. The following message is displayed:

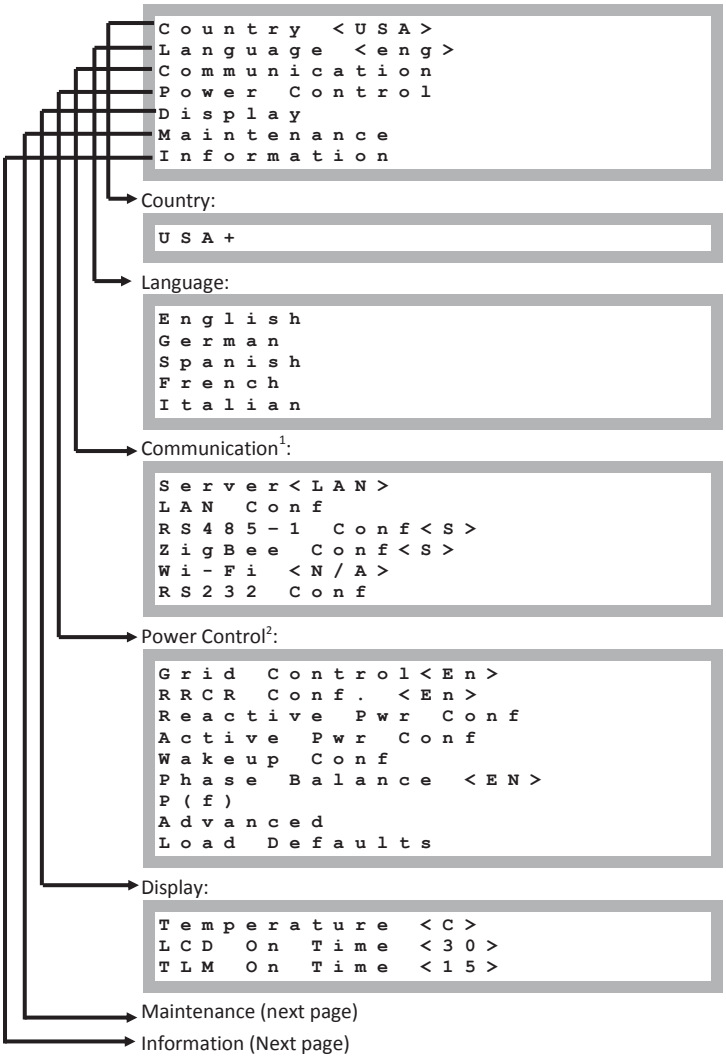
```
    Please  enter
    Password
        ********
```

4 Use the three right-most internal LCD user buttons to type in the following password: **12312312**. The following message is displayed:

```
Country  <USA>
Language  <eng>
Communication
Power  Control
Display
Maintenance
Information
```

The inverter is now in Setup mode and all its LEDs are lit. The inverter automatically exits Setup mode if no buttons are pressed for more than 2 minutes.

The following shows a hierarchical tree of the menu options, which are described in *Inverter Configuration Menu Options* on page 45. Actual menus may vary from shown depending on the firmware version of the inverter.



[1] If ZigBee is connected, the Wi-Fi Conf menu is not displayed. If ZigBee is not connected, ZigBee Conf and Wi-Fi Conf are both displayed with <N/A>.

[2] Phase Balance is applicable to single phase inverters only.

Maintenance:

```
Diagnostics
Date and Time
Reset Counters
Factory Reset
SW Upgrade SD-Card
AFCI <En>
Manual AFCI Test
```

Information:

```
Versions
Error Log
Warning log
```

Configuring the Inverter Using the External LCD Light Button

Use the LCD light button for configuring basic settings, communication setup and for displaying the Error log and Warning Log without having to open the inverter cover. There are fewer menus available when using this configuration option; however, the functionality is the same as when using the LCD User buttons.

1. Turn the inverter ON/OFF switch to OFF.
2. Press and hold down the LCD light button until the following message is displayed:

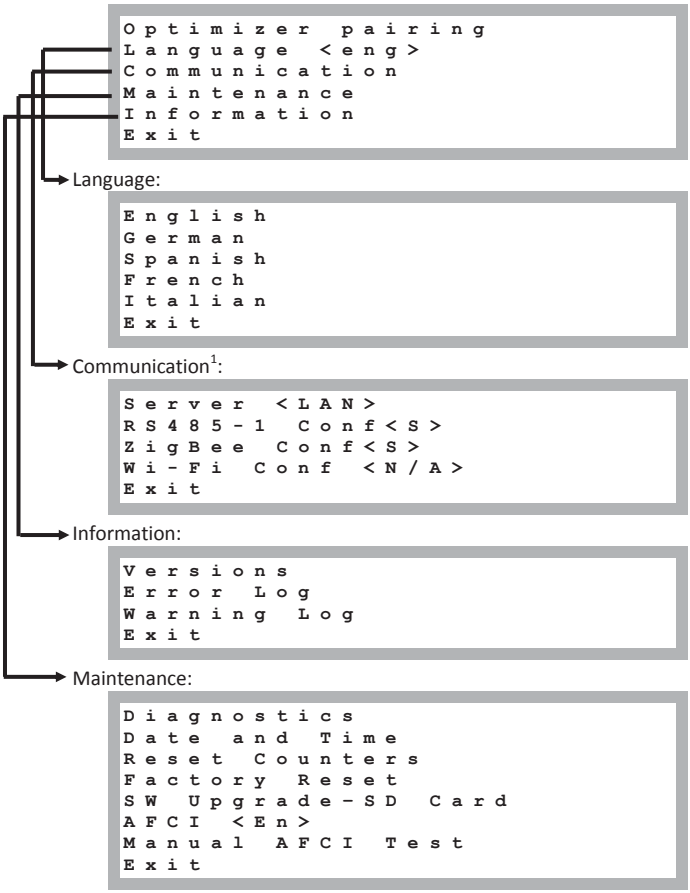
```
Keep holding button
for pairing, release
to enter menu...
Remaining 3sec
```

Releasing the button displays the following menu:

```
Optimizer pairing
Language <eng>
Communication
Maintenance
Information
Exit
```

3. Short-press (one second) to scroll down to the next menu option, and long-press (three seconds) to select the item. You can use the **Exit** options in these menus to move up one menu level or to exit the Setup mode from the main menu.

The following shows a hierarchical tree of the menu options that appear when using the LCD light button:



The options presented in these menus are described in the next section.

[1] If ZigBee is connected, the Wi-Fi Conf menu is not displayed. If ZigBee is not connected, ZigBee Conf and Wi-Fi Conf are both displayed with <N/A>.

Inverter Configuration Menu Options

This section describes how to use the LCD menus for configuring the inverter. Configuration is only available when the inverter ON/OFF switch is OFF. Use either the internal LCD user buttons or the external LCD light button to move between and select menu options.

Country and Grid

Configuring the country and grid is available using the internal user buttons only.

1 Select the **Country** option to specify the country in which the inverter is installed and the grid to which it is connected. This parameter may arrive pre-configured. If so, verify that it is set to the proper country.

WARNING!

The inverter must be configured to the proper country in order to ensure that it complies with the country grid code and functions properly with that country grids.

L'onduleur doit être configuré pour le pays approprié afin d'assurer un fonctionnement convenable avec le réseau de ce pays.

A list of countries is displayed. If no country is configured, the value is **<NONE>**.

NOTE:

If an inverter is not configured to any country, it will not produce energy.

A plus sign **(+)** near the country indicates that another menu will be displayed after selection.

The following list appears when USA+[1] is selected.

```
Auto
208V
240V
208V  No  Neutral
240V  No  Neutral
277V
Hawaii  Auto
Hawaii  208V
Hawaii  240V
Hawaii  208V  No  N
Hawaii  240V  No  N
Hawaii  277V
```

- When selecting **Auto** (single phase only), the inverter automatically detects the used grid: 208VAC or 240VAC.
  When using single phase inverters, refer to Figure 2 and Figure 3 on page 10 to determine if the Auto option may be used.
- When selecting an option with **No Neutral** or **No N**, connection to Neutral line is not required. For any other option, you must connect the Neutral line.
- When connecting to the 480/277V grid, select the 277V setting.

2 Confirm your country selection in the confirmation screen: Toggle to **YES** and press **Enter**.

Language

1 Select the Language option to set the language in which the LCD should display.

2 Confirm your language selection in the confirmation screen: Toggle to **YES** and press **Enter**.

[1] This list is applicable for single phase inverter. For three phase inverters, only 208V or 277V will be displayed according to the inverter part number.

Communication

1. Select the **Communication** option to define and configure the communication option used by the inverter to communicate with the SolarEdge monitoring portal and the communication option used to communicate between multiple inverters.
2. Select **Server** to set which communication method is used to communicate between the inverter and the SolarEdge monitoring portal. Refer to *Chapter 7: Setting Up Communication* on page 54 for a full description of these communication options.

NOTE:
This menu shows only the communication options installed in the inverter.

3. The following shows a hierarchical tree of the menu options in the **Communication** menu. For detailed information about all the configuration options, refer to the *Communication Options Application Note*, available on the SolarEdge website at http://www.solaredge.com/files/pdfs/solaredge-communication_options_application_note_v2_250_and_above.pdf.

Communication[1]:

```
Server<LAN>
LAN Conf
RS485-1 Conf<S>
ZigBee Conf<S>
Wi-Fi Conf<N/A>
RS232 Conf
```

Server:

```
LAN
RS485
Zigbee
RS232
None
```

LAN Conf:

```
IP Config
Set DHCP <en>
Set IP
Set Mask
Set Gateway
Set DNS
Set Server Addr
Set Server Port
```

RS485-1 Conf:

```
Device Type<SE>
Protocol<M>
Device ID<1>
Slave Detect
```

ZigBee Conf (enabled only if the internal module is connected):

```
Device Type<SE>
Protocol<MPM>
Device ID<1>
PAN ID
Scan Channel
Load ZB Defaults
Slave Detect
```

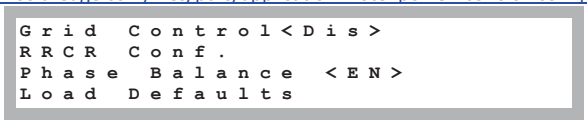
RS232 Conf:

```
Device Type<SE >
Protocol<GSM>
Set APN
Set Modem Type
Set User Name
Set Password
```

[1] If ZigBee is connected, the Wi-Fi Conf menu is not displayed. If ZigBee is not connected, ZigBee Conf and Wi-Fi Conf are both displayed with <N/A>, and their menus are not accessible.

Power Control

For detailed information about active and reactive power control options refer to the *Power Control Application Note*, available on the SolarEdge website at http://www.solaredge.com/files/pdfs/application_note_power_control_configuration.pdf.



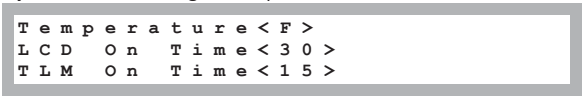
NOTE:

Phase Balance is applicable to single phase inverters only. For detailed information, refer to the *SolarEdge Phase Balancing Manual*, available on the SolarEdge website at http://www.solaredge.com/files/pdfs/phase_balancing_connection_guide.pdf

The Grid Control option is disabled by default. Enabling it opens additional options in the menu, as shown on page 42.

Display

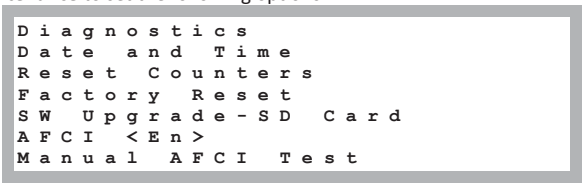
Select **Display** to set the following three options:



- **Temperature**: Select Celsius or Fahrenheit units.
- **LCD On Time <30>**: The number of seconds that the LCD backlight is ON after pressing the LCD light button. Set a value within the range of 10-120 seconds.
- **TLM On Time <15>**: The number of minutes that the LCD backlight is ON while viewing the *Telemetry* window. Set a value within the range of 1-120 minutes.

Maintenance

Select **Maintenance** to set the following options:



- **Diagnostics**: Displays the **Isolation Status** screen. Refer to http://www.solaredge.com/files/pdfs/application_note_isolation_fault_troubleshooting.pdf
- **Date and Time**: Set the internal real-time clock. If connected to the SolarEdge monitoring portal, the date and time are set automatically and only time zone should be set.
- **Reset Counters**: Reset the accumulated energy counters that are sent to the SolarEdge monitoring portal
- **Factory Reset**: Perform a general reset to the inverter default settings.
- **SW Upgrade SD Card**: Perform a software upgrade using an SD card.

- **AFCI**: Enable or disable arc-fault self-test. Refer to *Appendix G: Inverter Arc Detection* on page 94
- **Manual AFCI Test:** Start a self-test for arc detection. Refer to *Appendix G: Inverter Arc Detection* on page 94.

Information

Select **Information** to display the following options:

```
Versions
Error  Log
Warning  log
```

- **Versions:** Displays inverter firmware versions :

```
ID:   ########   ##
DSP1:0001.0210.0188
DSP2:0001  0034.0000
CPU:0002.0037.0000
```

  - **ID:** The inverter ID.
  - **DSP 1/2:** The DSP digital control board firmware version
  - **CPU:** The communication board firmware version

NOTE:
Please have these numbers ready when you contact SolarEdge support.

- **Error Log:** Displays the last five errors.
- **Warning Log:** Displays the last five warnings.

Inverter Status Screens – Operational Mode

Pressing the external LCD light button turns on the LCD backlight. Additional presses display the following screens one after the other.

Initial Inverter Status

```
Vac[v]   Vdc[v]   Pac[w]
240.7    371.9    2349.3
P_OK:  XXX/YYY   <S_OK>
                    ON
```

- **Vac [V]:** The AC output voltage.
- **Vdc [V]:** The DC input voltage.
- **Pac [W]:** The AC output power.
- **P_OK: XXX/YYY:** There is a connection to the power optimizers and at least one power optimizer is sending monitoring data. XXX is the number of power optimizers for which telemetries have been received in the last two hours. YYY is the number of paired power optimizers identified during the most recent pairing process. If XXX and YYY are not equal, there may be a problem with one or more power optimizers.
- **S_OK**: The connection to the SolarEdge monitoring portal is successful (appears only if the inverter is connected to the server)
- **ON/OFF:** Indicates the position of the inverter ON/OFF switch.

Main Inverter Status

```
Vac[v]   Vdc[v]   Pac[w]
240.7    371.9    3210.0
Fac[Hz]   OPs_Ok   Temp
50.0        11      28.2
```

- **Vac [V:** The AC output voltage.
- **Vdc [V]:** The DC input voltage.
- **Pac [W]:** The AC output power.
- **Fac[Hz]:** The AC output frequency.
- **OPs_Ok:** Number of optimizers sending telemetries (indicating that they are paired)
- **Temp [C or F]**: The inverter's heat sink temperature

Energy Meter Status

Displays the total energy produced during the last day, month, year and since inverter installation.

```
Day[Wh]:                    0.0
Month[KWh]:                 0.0
Year[KWh]:                  0.0
Total[KWh]:                 0.0
```

If a revenue grade meter is preassembled in the inverter, the following status screen, showing the total energy reading, is displayed instead of the above screen :

```
Revenue  Grade  Meter
Status:  <OK>
<Error  Message>
Total[Wh]:XXXXXXX
```

Status: Displays OK if the meter is communicating with the communication board.

<Error message>: If an internal RGM error is displayed here, contact SolarEdge Support.

Total (Wh): The energy production as read by the RGM. If the inverter is connected to the SolarEdge server, this value will also be displayed in the monitoring portal.

NOTE:

This data is accumulated according to an internal real-time clock.

Telemetry Status

This window displays the last power optimizer telemetry received. The display changes as each power optimizer sends its telemetry.

During installation, view this window for some time, in order to observe the power optimizer report process, verify proper installation, and for troubleshooting .

```
Module:              000C1ED9-03
Energy[Wh]:          0
Vdc_O[V]:            40.5
Vdc_I[V]:            29.5
```

- **Module#**: Power optimizer serial number
- **Energy**: power optimizer energy

- **Vdc_O**: Power optimizer output voltage
- **Vdc_I**: Power optimizer input voltage (module voltage)

ID Status

This window displays the inverter software version and the country to which the inverter is configured.

```
ID:   ########   ##
DSP1/2:1.0210/1.0034
CPU:0002.0111
Country:USA2
```

Server Communication Status

```
Server:LAN          <S_OK>
Status:             <OK>
       xxxxxxxx
<ERROR MESSAGE>
```

- **Server**: The method of connection to the SolarEdge monitoring portal
- **S_OK**: The connection to the SolarEdge monitoring portal is successful (should appear only if the inverter is connected to the SolarEdge monitoring server).
- **Status**: Displays OK if the inverter established a successful connection and communication with the specified internal server port/device (LAN, RS485 or ZigBee module).
- **xxxxxxxx**: Eight-bit Ethernet communication connection status: A string of 1s and 0s is displayed. 1 indicates OK, 0 indicates an error. For a list of the possible errors and how to troubleshoot them, refer to *Troubleshooting Communication* on page 63.
- **Error message**, according to failure

  Refer to *Troubleshooting Communication* on page63 for detailed information.

IP Status

This window describes the Ethernet configuration: IP, Mask, Gateway and MAC address (Media Access Control) of the inverter.

```
IP    192.168.2.119
MSK   255.255.255.0
GW    192.168.2.1
MAC   0-27-02-00-39-36
```

ZigBee Status

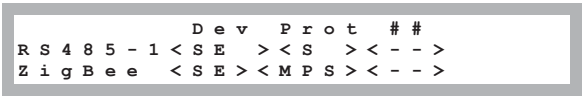
This window describes the ZigBee configuration:

```
PAN:XXXX
Ch:XX/XXXX    RSSI:<L>
ID:XXXXXXXX
MID:XXXX  XX
```

- **RSSI**: The receive signal strength indication of the closest ZigBee in the SolarEdge system. L = low, M = medium, H = high and - = no signal.
- **PAN ID**: The ZigBee transceiver pan ID
- **Ch**.: The ZigBee transceiver channel
- **ID**: The ZigBee transceiver ID

- **MID**: The Master ID of the coordinator (master) ZigBee module. This field is shown only in devices with router (slave) ZigBee modules. This field appears after a successful ZigBee association. If a ZigBee module is not connected, a *No ZigBee* message is displayed instead of the **MID** field.

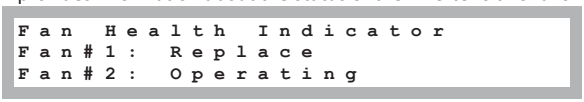
Communication Ports Status



- **##**: The total number of slaves detected on the specific port
- **DEV**: The type of device that was configured to a specific port (based on the port's functionality), as follows:
  - **SE**: SolarEdge device (default)
  - **MTR**: Revenue grade meter
  - **LGR**: Non-SolarEdge logger
- **PROT:** The protocol type to which the port is set:
  - For a SolarEdge device:
    - **S:** SolarEdge slave
    - **M:** SolarEdge master
    - **WN**: WattNode revenue grade meter
    - **P2P:** ZigBee point-to-point
    - **MPM:** ZigBee multipoint master (for a ZigBee coordinator module)
    - **MPS:** ZigBee multipoint slave (for a ZigBee router module)
  - **SS:** SunSpec - For a non-SolarEdge logger

Fan Health Status – Three Phase Inverters

This window provides information about the status of the inverter's two fans:



Each fan can have one of the following statuses:

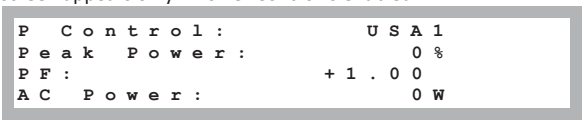
- Operating: Fan OK
- **Not Working**: This status may indicate a system error and not necessarily a faulty fan. Turning AC OFF and ON again may clear this status. If the status does not change, replace the fan.
- **Replace:** This status indicates a faulty fan that requires replacement

  When a fan has the status **Replace:**
  - The display blinks constantly (but not when the inverter is in night mode) until the fan is replaced.
  - An error appears that the fan is faulty (refer to *Appendix A: Errors and Troubleshooting* on page 63).
  - The Fault LED is not lit.

For more information, refer to *Appendix D: Fan Maintenance and Replacement* on page 87.

Power Control Status

This status screen appears only if Power Control is enabled.



- **P Control**: Specifies the country according to which power control is done.
- **Peak Power**: Specifies the ratio between the power the inverter can output and the inverter's maximum AC power. If active power is limited (either using the RRCR option or using the Active Power Limit option), the limit will be displayed here.
- **PF**: Power Factor. Specifies the CosPhi corresponding to the ratio between active and reactive power.
- **AC Power**: Specifies the AC power that the inverter is currently producing.
- For more information, refer to the *Power Control Application Note*, available on the SolarEdge website at http://www.solaredge.com/files/pdfs/application_note_power_control_configuration.pdf.

Chapter 7: Setting Up Communication

Power optimizers send information to the inverter via the DC power lines (the PV output circuit). No additional wires or configurations are required for this purpose. The information is then sent from the inverter to the SolarEdge monitoring portal through the Internet. In order to send the data from the inverter, a communication connection must be set up, as described in this chapter. Communication setup is not required for power harvesting and is needed only for using the SolarEdge monitoring portal.

This chapter also describes setting up communication between multiple inverters for a master/slave configuration.

NOTE:

When connecting the communication cables, make sure that the ON/OFF switch at the bottom of the inverter is turned OFF, and the AC/DC Safety Switch is turned OFF.

When configuring the communication parameters, make sure that the ON/OFF switch is OFF, and the AC/DC Safety Switch is turned ON.

Communication Connectors

Two communication glands are used for connection of the various inverter communication options. Each gland has three openings. The table below describes the functionality of each opening. Unused openings should remain sealed.

Gland#	Opening	Functionality	Cable Size (diameter)
1 (PG16)	One small	External antenna cable	2-4 mm
	Two large	Ethernet connection (CAT5/6) or ZigBee	4.5-7 mm
2 (PG13.5)	All three	RS485	2.5-5 mm

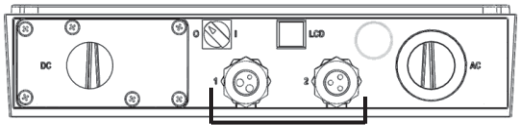


Figure 30: Communication glands

Two types of communication boards are available, differing in the Ethernet connector: one with an 8-pin terminal block connection and the other with a standard RJ45 Ethernet connector, as shown below:

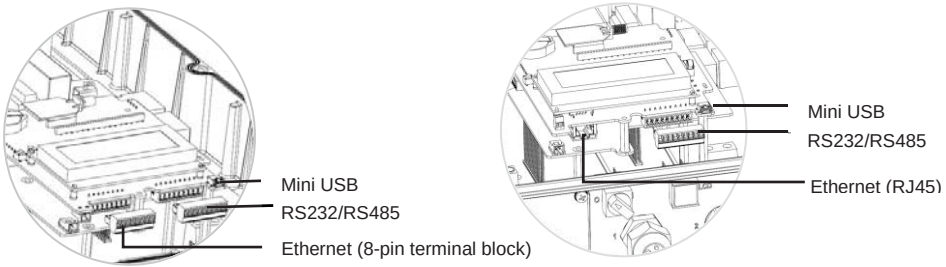


Figure 31: Internal connectors

Communication Types

- **Ethernet:** page 55, used for a LAN connection
- **RS485:** page 59, the most commonly used communication type, used for the connection of multiple SolarEdge devices on the same bus in a master-slave configuration. RS485 type can also be used as an interface to external non-SolarEdge devices, such as revenue meters and data loggers.
- **ZigBee**: page 61, Optional wireless communication (purchased separately)
- **USB**: page 61, enables connection of a laptop to the inverter

Always connect the communication options when the inverter is OFF.

Removing the Inverter Cover

Use the following procedure for cover removal for communication connection purposes.

1. Turn the AC/DC Safety Switch to OFF.
2. Turn the inverter ON/OFF switch to OFF.
3. Disconnect the AC to the inverter by turning OFF the circuit breakers on the distribution panel. Wait 5 minutes for the capacitors to discharge.
4. Open the inverter cover's six Allen screws and carefully pull the cover horizontally before lowering it.

CAUTION:

When removing the cover, make sure not to damage internal components. SolarEdge will not be held responsible for any components damaged as a result of incautious cover removal.

Lors du retrait du couvercle, assurez-vous de ne pas endommager les composants internes. SolarEdge ne peut être tenue pour responsable des composants endommagés à la suite d'une imprudence dans le retrait du couvercle.

Creating an Ethernet (LAN) Connection

This communication option enables using an Ethernet connection to connect the inverter to the monitoring portal through a LAN.

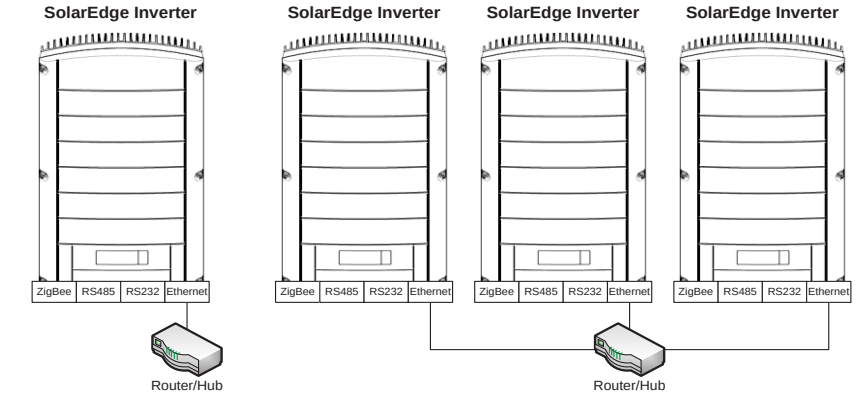


Figure 32: Example of Ethernet connection

1 Remove the inverter cover as described in *Removing the Inverter Cover* on page 55.

2 Open the communication gland #1.

CAUTION:

The internal side of the gland includes a rubber waterproof fitting, which should be used to ensure proper sealing.

Le cote interne du gland contient une rondelle qui doit être utilisée pour une bonne étancheïté.

3 Remove the plastic seal from the large opening that has a cut in the rubber fitting and insert an Ethernet CAT5/6 cable through the opening.

CAT5/6 standard cables have eight wires (four twisted pairs), as shown in the diagram below. Wire colors may differ from one cable to another. You can use either wiring standard, as long as both sides of the cable have the same pin-out and color-coding[1].

RJ45 Pin #	Wire Color		10Base-T Signal 100Base-TX Signal
	T568B	T568A	
1	White/Orange	White/Green	Transmit+
2	Orange	Green	Transmit-
3	White/Green	White/Orange	Receive+
4	Blue	Blue	Reserved
5	White/Blue	White/Blue	Reserved
6	Green	Orange	Received-
7	White/Brown	White/Brown	Reserved
8	Brown	Brown	Reserved

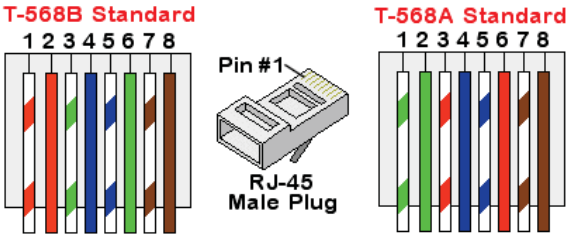


Figure 33: Standard cable wiring

[1] The inverter connection does not support RX/TX polarity change. Supporting crossover Ethernet cables depends on the switch capabilities.

4 Depending on the inverter connector type (RJ45 or an 8-pin terminal block), Connect as follows:

- If the inverter has an 8-pin terminal block connector for Ethernet communication:
  - Remove the cable's external insulation using a crimping tool or cable cutter and expose eight wires.
  - Pull the connector out, as shown below:

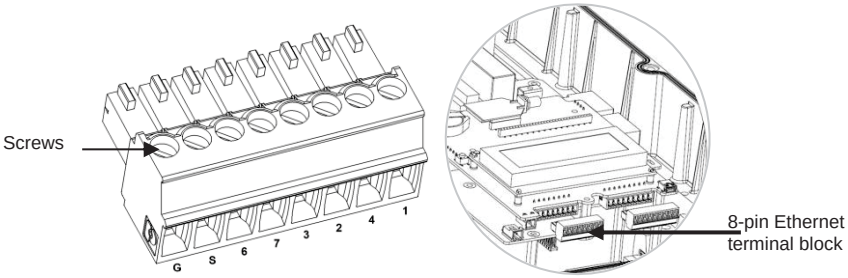


Figure 34: The 8-pin Ethernet terminal block

  - Loosen the screws, except for that of pin G. Insert the stripped wire ends into the pins according to the following table:

Terminal Block Pin #	RJ45 Pin #	Color	
		T568B Standard	T568A Standard
1	1	White/Orange	White/Green
2	2	Orange	Green
3	3	White/Green	White/Orange
4	4 and 5	Blue + White/Blue	Blue + White/Blue
6	6	Green	Orange
7	7 and 8	Brown + White/Brown	Brown + White/Brown
S	Aluminum shield		
G-unconnected			

  - Tighten the screws of the Ethernet terminal block.
  - Check that the wires are fully inserted and cannot be pulled out easily.
  - Push the Ethernet terminal block firmly all the way into the communication board.

- If the inverter has an RJ45 connector for Ethernet communication, use either a pre-crimped cable to connect via gland no.1 to the RJ45 plug on the inverter's communication board or , if using a spool of cable, connect as follows :
  - Insert the cable through gland no.1.
  - Remove the cable's external insulation using a crimping tool or cable cutter and expose eight wires.
  - Insert the eight wires into the RJ45 connector, as described in Figure 33.
  - Use a crimping tool to crimp the connector.

- Connect the Ethernet connector to the RJ45 plug on the inverter's communication board.

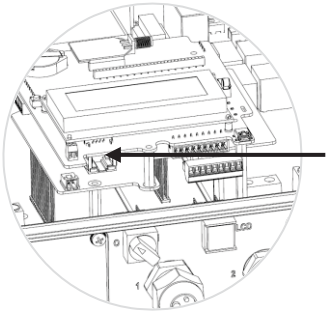


Figure 35: The RJ45 Ethernet connector

5 For the switch/router side, use a pre-crimped cable or use a crimper to prepare an RJ45 communication connector: Insert the eight wires into the RJ45 connector in the same order as in Figure 33.

6 Connect the cable's RJ45 connector to the RJ45 port of the Ethernet switch or router. You can connect more than one inverter to the same switch/router or to different switches/routers, as needed. Each inverter sends its monitored data independently to the SolarEdge monitoring portal.

7 Inverters are configured by default to **LAN**. If reconfiguration is required:

- Make sure the ON/OFF switch is OFF.
- Turn ON the AC to the inverter by turning ON the circuit breaker on the main distribution panel.
- Turn ON the AC/DC Safety Switch.

WARNING!

ELECTRICAL SHOCK HAZARD. Do not touch uninsulated wires when the inverter cover is removed.

RISQUE D'ÉLECTROCUTION, ne touchez pas les fils non isolés lorsque le couvercle de l'onduleur est retiré

- Use the user buttons to configure the connection, as described in *Communication* on page 46.

NOTE:

If your network has a firewall, you may need to configure it to enable the connection to the following address:

- Destination Address: prod.solaredge.com
- TCP Port: 22222 (for incoming and outgoing data)

8 Verify the connection, as described in *Verifying the Connection* on page 61.

Creating an RS485 Bus Connection

The RS485 option enables creating a bus of connected inverters, consisting of up to 31 slave inverters and 1 master inverter. Using this option, inverters are connected to each other in a bus (chain), via their RS485 connectors. The first and last inverters in the chain must be terminated.

If a revenue grade meter is connected to your inverter, it uses the RS485 port and therefore an RS485 communication bus cannot be created.

The following sections describe how to physically connect the RS485 bus and how to configure the bus.

To connect the RS485 communication bus:

1. Remove the inverter cover as described in *Removing the Inverter Cover* on page 55.
2. Remove the seal from one of the openings in communication gland #2 and insert the wire through the opening.
3. Pull out the 9-pin RS485/RS232 terminal block connector, as shown below:

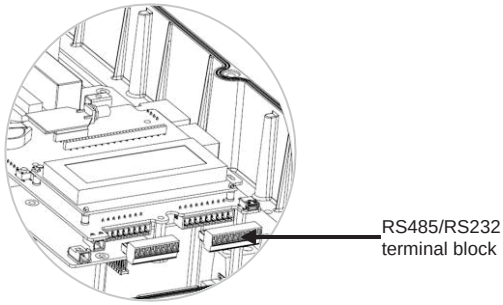


Figure 36: The RS485/RS232 terminal block

4. Loosen the screws of pins **B**, **A** and **G** on the left of the RS-485 terminal block.

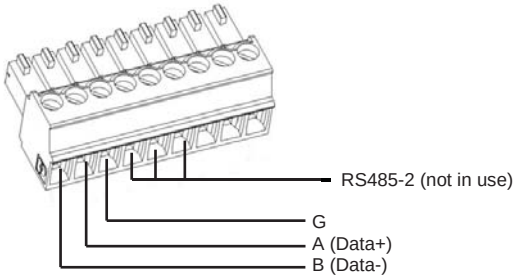


Figure 37: RS485/RS232 terminal block

5. Insert the stripped wire ends into the **G**, **A** and **B** pins shown above. Use Four- or six-wire twisted pair cable for this connection. You can use any color wire for each of the **A, B** and **G** connections, as long as the same color wire is used for all A pins, the same color for all B pins and the same color for all G pins.

6 Connect all B, A and G pins in all inverters. The following figure shows this connection schema:

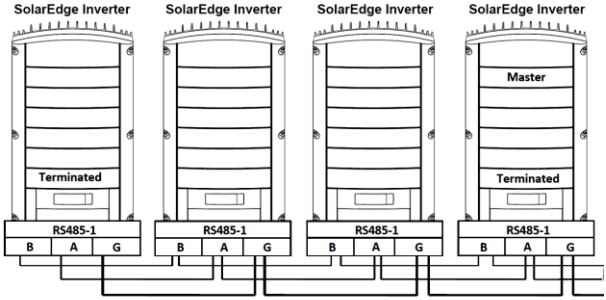


Figure 38: Connecting the Inverters in a Chain

NOTE:
Do not cross-connect **B**, **A** and **G** wires. Do not insert wires into RS485-2 pins.

7 Tighten the terminal block screws.

8 Check that the wires are fully inserted and cannot be pulled out easily.

9 Push the RS485 terminal block firmly all the way into the connector on the right side of the communication board.

10 Terminate the first and last SolarEdge device (inverter/SMI/Control and communication gateway, etc.) in the chain by switching a termination DIP-switch inside the inverter to ON (move the switch up). The switch is located on the communication board and is marked **SW7**.

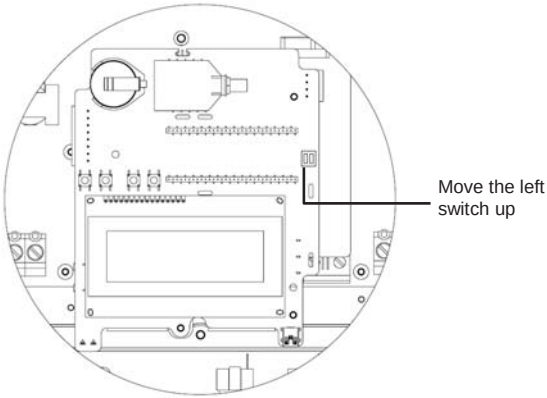


Figure 39: RS485 termination switch

NOTE:
Only the first and last SolarEdge devices in the chain should be terminated. The other inverters in the chain should have the termination switch OFF (down position).

To connect to the monitoring portal:

1. Designate a single inverter as the connection point between the RS485 bus and the SolarEdge monitoring portal. This inverter will serve as the master inverter.
2. Connect the master to the SolarEdge monitoring portal via the LAN, or ZigBee communication option.

To configure the RS485 communication bus:

All inverters are configured by default as slaves. If reconfiguration is required:

1. Turn ON the AC/DC Safety Switch.
2. Make sure the ON/OFF switch is OFF.
3. Turn ON the AC to the inverter by turning ON the circuit breaker on the main distribution panel.

WARNING!

ELECTRICAL SHOCK HAZARD. Do not touch uninsulated wires when the inverter cover is removed.

4. Use the user buttons to configure the connection. To configure the inverter designated as master, select the following in the LCD menus:
   - Communication ➔ Server ➔ *LAN or ZigBee*
   - RS485-1 Conf. ➔ Device Type ➔ *SolarEdge*
   - RS485-1 Conf. ➔ Protocol ➔ *Master*
   - RS485-1 Conf. ➔ *Slave Detect*

   The system starts automatic detection of the SolarEdge slave inverters connected to the master inverter. The inverter should report the correct number of slaves. If it does not, verify the connections and terminations.
5. Verify the connection of the master to the SolarEdge monitoring portal, as described in *Verifying the Connection* on page 62.

Creating a ZigBee Connection

This communication option enables using a ZigBee connection for one of the following:

- To connect the inverter to the SolarEdge monitoring portal
- To create a master/slave bus of connected inverters

The ZigBee kit is purchased separately and provided with a user manual, which should be reviewed prior to connection. It is available on the SolarEdge website at http://www.solaredge.us/groups/products/communication (under ZigBee).

Connecting a Laptop to the Inverter

To connect a laptop to the inverter, use the internal mini-USB connector (type B 5-pin) located on the inverter communication board (see Figure 31 on page 54).

The USB port uses a standard USB driver that can connect to any standard PC or laptop with a Windows operating system. If the USB connection is not recognized, install a USB driver, downloadable directly from the manufacturer website at http://www.ftdichip.com/Drivers/VCP.htm.

Verifying the Connection

1. Close the inverter cover: Attach the inverter cover and secure it by tightening the screws with a torque of 4.0 N*m/ 2.9 lb.*ft. For proper sealing, first tighten the corner screws and then the two central screws. The following figure illustrates the recommended order:

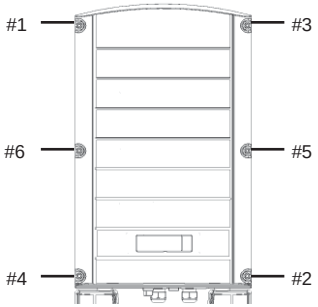


Figure 40: Tightening Order of the Screws

2. Turn ON the AC to the inverter by turning on the circuit breaker on the distribution panel and turning on the AC/DC Safety Switch.
3. Wait for the inverter to connect to the SolarEdge monitoring portal. This may take up to two minutes.

   A message similar to the following appears on the LCD panel:

```
Vac[v]   Vdc[v]   Pac[w]
240.7    5.2V        0.0
              <S_OK>
                   OFF
```

S_OK: Indicates that the connection to the SolarEdge monitoring portal is successful. If S_OK is not displayed, refer to *Appendix A: Errors and Troubleshooting* on page 63.

Appendix A: Errors and Troubleshooting

This appendix describes the error messages that appear on the inverter LCD panel when an error occurs, and how to troubleshoot them.

Troubleshooting Communication - S_OK Not Displayed

If S_OK is not displayed, perform the following:

To troubleshoot Ethernet communication:

When Ethernet communication is used, the *Server Communication Status* window, as described on page 51, can be used to identify the location of the error.

xxxxxxxx is a string of 1s and 0s showing an eight-bit communication connection status. 1 indicates OK and 0 indicates an error. The possible errors and their troubleshooting are detailed in the following table:

Bit Location	Error Message	Error Description	Troubleshooting
1st	LAN Disconnected	An Ethernet physical cable connection fault: The Ethernet link or physical Ethernet cable are not connected properly	Check the cable pin-out assignment and cable connection. Refer to *Creating an Ethernet (LAN) Connection* on page 55. Check the wires to be sure there are no broken connections.
2nd	DHCP Failed, or Invalid DHCP Config	The inverter failed to get a valid IP address from the DHCP server, or The DHCP/static IP settings in the gateway are not the same as those of the router.	Check the router and inverter configuration. Consult your network IT
3rd	Gateway Ping Failed	The connection to the router is not available: Ping to the first local switch/router failed (LAN error)	Check the physical connection to the switch/router. Check that the link LED at the router /switch is lit (indicating phy-link). If OK - contact your network IT, otherwise replace the cable or change it from cross to straight connection
4th	G Server Ping Failed	The connection to the Internet is not available: Ping to google.com failed	Connect a laptop and check for internet connection. If internet access is unavailable, contact your IT admin or your internet provider. For WIFI networks, ensure that username and password are as defined in the internet provider AP/router.
5th	Server x Ping Failed	Ping to redundant server #x failed	Check the SolarEdge server address, under LAN Conf submenu ▪ Address: prod.solaredge.com ▪ Port: 22222 Check with your network administrator whether a firewall or another device is blocking transmission.
6th			
7th			
8th	Tcp Connect. Failed	The connection to the SolarEdge server was not established: Communication with the server failed	

To troubleshoot RS485 communication:

1. If after a successful slave detection, the number of slaves reported in the master is smaller than the actual number of slaves, check the Server Communication status screen of every slave inverter. The following should appear:

If **No Master Found** message appears, the master device is not responsive or the RS485 cable is not connected. Check the connections to the master device and fix if required.

Additional troubleshooting:

1. Check that the modem or hub/router is functioning properly.
2. Check that the connection to the internal connector on the inverter communication board is properly done.
3. Check that the selected communication option is properly configured.
4. Use a method independent of the SolarEdge inverter to check whether the network and modem are operating properly. For example, connect a laptop (with wireless disabled) to the Ethernet router and connect to the Internet.
5. Check whether a firewall or another type of network filter is blocking communication.
6. For ZigBee troubleshooting, refer to the ZigBee installation manuals.

Error Codes

The error code numbers may differ depending on the inverter type (single phase or three phase) as described in the table below.

The error messages include an error number and a description, and have the following format:

```
Error code XXX

X X X X X X X X X X X X X X X X X X X X
X X X X X X X X X X X X X X X X X X X X
```

An error message is displayed for 30 seconds, after which the inverter waits the necessary reconnection time and then restarts. During this time, the LCD displays the Waking Up message and the remaining time to reconnection.

WARNING!

All Warnings and Cautions in this manual should be adhered to while troubleshooting an error.

Tous les avertissements et précautions mentionnés dans ce manuel doivent être aussi appliqués en cas de dépannage.

Error # Single Phase	Error # Three Phase	LCD Message	Description	Troubleshooting
N/A	1-4	Fan # Failure	One of the fans is not working	Check the *Fan Health Status – Three Phase Inverters* on page 52. If required, replace the fan (a replacement kit is available from SolarEdge).
4, 5, 8, 12, 18-23, 39, 42, 45	45, 48, 50-53, 94, 108-111,113	SW Error	Internal software error	If the fault persists, contact SolarEdge support.
N/A	112	Wrong AC connection	The lines connections to the inverter are incorrect, for example: AC line 1 from the grid is connected to line 2 at the inverter so there is no 120deg between L2 to L1 and L3 to L2 at the inverter side.	Switch between L1 and L2 or L2 and L3 connections
9, 13	N/A	AC Current Surge	The internal hardware that measures AC current has measured substantially high output currents. This may occur because of changes in the AC voltage or a switching load near the site.	If the fault persists: ▪ Check the AC connection to the inverter. ▪ Check with the grid operator if a large surge source or irregular load exists near the site. ▪ If the grid does not have problems contact SolarEdge support.

Error # Single Phase	Error # Three Phase	LCD Message	Description	Troubleshooting
10, 37, 38	76, 77, 90	Ground Current - RCD	Ground current surge. The internal hardware that measures ground fault has measured substantially high ground currents.	Ground faults may occur due to insufficient insulation to the ground. **WARNING!** ELECTRICAL SHOCK HAZARD. Do not touch uninsulated wires when the inverter cover is removed Extreme care must be taken when troubleshooting this error. *RISQUE D'ELECTROCUTION* *Ne touchez pas à des câbles non isolés !* *Une attention extrême doit être prêtée durant le traitement de cette erreur.* Only a qualified technician should handle this problem, and only after taking proper precautions. **1** Turn the inverter ON/OFF switch to OFF. **2** Wait five minutes for the input capacitors to discharge. **3** Disconnect the AC breaker. **4** Disconnect the DC inputs. **5** Connect each DC string separately, turn the AC and the inverter ON/OFF switch to ON, until the error appears for the faulty string ▪ Do not connect strings with a grounding fault to the inverter. ▪ For further documentation about possible ground current error sources and solutions, contact SolarEdge support. ▪ A certified installer must fix the faulty string before connecting it to the inverter.

Error # Single Phase	Error # Three Phase	LCD Message	Description	Troubleshooting
14	58/59/60	AC Voltage Too High (Line 1/2/3)	AC voltage surge. The internal hardware that measures AC voltage has measured substantially high sudden output voltage.	If the fault persists: ▪ Check the AC connection to inverter. ▪ Verify that the inverter is set to the correct country. ▪ Check with the grid operator if a large surge source or irregular load exists near the site. ▪ Verify that the output wire size matches the distance between the inverter and the location of the grid connection. ▪ Use a larger gauge wire for the AC output. ▪ Refer to the *AC Wiring Application Note*, available on the SolarEdge website at http://www.solaredge.com/files/pdfs/application-note-recommended-wiring.pdf
15	102	DC Voltage Too High	DC overvoltage. The input DC voltage exceeds the maximum supported level.	The SolarEdge system normally eliminates DC overvoltage errors: When DC overvoltage is detected, the inverter shuts off the power optimizers and restarts. If the fault persists: ▪ Turn OFF the inverter ON/OFF switch. If after five minutes, the LCD panel does not show a low safety voltage (1V per optimizer), check which string is malfunctioning and recheck its connections to the inverter. ▪ Proceed according to Power Optimizer Troubleshooting on page 71 ▪ Re-commission all inverters in the site, as described in *Chapter 5: Commissioning the Installation* on page 35.
16	123	Hardware Error	Internal hardware error	If the fault persists, contact SolarEdge support.
17	104	Temperature Too High	Over temperature	If the fault persists: ▪ Verify that proper clearances exist around the inverter. ▪ Make sure that the heat-sink fins are clear of dirt and obstacles. ▪ Reinstall in a cooler location.
24	N/A	Faulty Temp. Sensor	Broken or unconnected Temperature sensor	If the fault persists, contact SolarEdge support.

Error # Single Phase	Error # Three Phase	LCD Message	Description	Troubleshooting
25	121	Isolation Fault	PV Isolation fault. The inverter has detected the PV solar array is not properly isolated from ground earth. The isolation is checked each time the inverter starts up.	If the fault persists: ▪ Check the PV installation for isolation problems and ground leakage. ▪ Only a certified PV installer must fix the faulty string before connecting it to the inverter. ▪ Refer to www.solaredge.com/files/pdfs/application_note_iosolation_fault_troubleshooting.pdf
26	122	Faulty AC Relay	The AC relay failed during wake-up tests.	If the fault persists: ▪ Disconnect inverter from AC grid. ▪ Contact SolarEdge support.
27, 153	95, 106, 120, 125, 126	Hardware Error	Internal hardware error.	If the fault persists, contact SolarEdge support.
28	N/A	RCD Sensor Error	The RCD measurement has failed during the wake-up test phase.	If the fault persists, contact SolarEdge support.
29-30	N/A	Phase Balance Error	The monitoring hardware that checks the balance of each phase (L1-N and L2-N) has exceeded allowed limit.	▪ Check the grid connection. ▪ Check the GND wire connection. ▪ Check the L1, L2 and Neutral wire connections. ▪ Verify symmetric load between L1 and L2. ▪ Consult the local grid authority.
31, 33	64/65/66	AC Voltage Too High (Line 1/2/3)	Grid voltage is above the limit permitted in this country.	▪ Verify that the inverter is set to the correct country. ▪ Turn OFF the inverters in the site and verify AC grid voltage. ▪ If the inverter is located far from the connection point to the grid, use a larger gauge AC wire. ▪ Consult the grid operator. ▪ If permitted by local authorities, use the SolarEdge Configuration Tool to change the settings.
32, 41	61/62/63, 67/68/69	AC Voltage Too Low	Grid voltage is below the limit permitted in this country.	▪ Verify that the inverter is set to the correct country. ▪ Consult the grid operator. ▪ If permitted by local authorities, use the SolarEdge Configuration Tool to change the settings.

Error # Single Phase	Error # Three Phase	LCD Message	Description	Troubleshooting
34	79/80/81	AC Freq Too High (Line 1/2/3)	Grid frequency is above the limit permitted in this country.	Handle this in the same manner as error 32.
35	82/83/84	AC Freq Too Low (Line 1/2/3)	Grid frequency is below the limit permitted in this country.	Handle this in the same manner as error 32.
36	72/74/75	DC Injection (Line 1/2/3)	DC feed detected on the AC output.	If the fault persists, contact SolarEdge support.
40	N/A	Islanding	AC grid voltage malfunctions. The inverter has shut off due to islanding.	When AC voltage returns, the inverter should restart after some time (time depends on country grid connection codes) If the problem persists, then consult with the grid operator whether frequent AC disruptions have occurred at the site.
43	N/A	Internal HW Error	Internal hardware error.	If the fault persists, contact SolarEdge support.
44	44	No Country Selected	The inverter is not configured to any country.	Select the country, as described on page 45.
46		Phase Unbalance		Change the **Phase Balance** option in the Inverter's LCD menu to **Disable**. Refer to *Power Control* on page 48 and to the *SolarEdge Phase Balancing Manual*, available on the SolarEdge website at http://www.solaredge.com/files/pdfs/phase_balancing_connection_guide.pdf
N/A	103, 119	UDC Min / DC Voltage Too Low	The input DC voltage is below the minimum level that is supported.	Turn the inverter OFF and then ON. If this fault persists, contact SolarEdge support.
N/A	49	Communication Error	Internal software error.	If this fault persists, contact SolarEdge support.
N/A	78	Grid Sync Error	Grid voltage or frequency is unstable.	If this fault persists, contact SolarEdge support.
N/A	91/92/93 (TZ L1/L2/L3), 96/97/98 (Iac L1/L2/L3 Max).	AC Over Current Line 1/2/3	Grid error.	If this fault persists, contact SolarEdge support.
N/A	99-101	AC Voltage Too High Line 1/2/3	Grid error.	Turn the inverter OFF and then ON. If this fault persists, contact SolarEdge support.
N/A	105	Temperature Too Low	Under temperature.	If this fault persists, reinstall the inverter in a warmer place.
N/A	124	Ground Current – RCD	Internal hardware error.	If this fault persists, contact SolarEdge support.

Error # Single Phase	Error # Three Phase	LCD Message	Description	Troubleshooting
150, 151	150, 151	Arc Fault Detected	An arc was detected on the DC side.	Refer to Appendix G: Inverter Arc Detection on page 94.
152	152	Arc detector self-test failed	The arc detector is checked every time the inverter starts up. The internal hardware that measures arcs failed during wake-up tests.	Refer to Appendix G: Inverter Arc Detection on page 94.

Power Optimizer Troubleshooting

Problem	Possible Cause	Possible Solution
String voltage is 0V	Output of one or more power optimizers is disconnected	Connect all power optimizer outputs
String voltage not 0V but lower than number of optimizers	One or more of the power optimizers are not connected in the string	Connect all power optimizers
	One or more of the modules are not connected properly to their power optimizer inputs	Connect the modules to the optimizer inputs
	Wrong polarity connection on one of the strings	Check polarity of the string output using a voltmeter and correct if needed.
String voltage higher than the number of optimizers **WARNING!** If the measured voltage is too high, the installation may not have a safe low voltage. PROCEED WITH CARE! A deviation of ±1% per string is reasonable. *Si la tension mesuree est trop haute, la tension basse de securite pourrait manquer dans l'installation. REDOUBLEZ DE PRECAUTION.* *Une deviation de ±1% par string est raisonnable.*	One or more extra power optimizer are connected in the string	Check if an extra power optimizer is connected in the string. If not – proceed to next solution.
	A module is connected directly to the string, without a power optimizer.	Verify that only power optimizers are connected in the string and that no module outputs are connected without a power optimizer. If the problem persists, proceed to the next step.
	A malfunction of one of the power optimizers	• Disconnect the wires that connect the power optimizers in the string. • Measure the output voltage of each power optimizer in order to locate the power optimizer that does not output the 1V safety voltage. • If a malfunctioning power optimizer is located, check its connections, polarity, module and voltage. • If a malfunction cannot be bypassed or resolved, skip the malfunctioning power optimizer, thus connecting a shorter string. • Do not continue before finding the problem and replacing the malfunctioning power optimizer.
	SafeDC mode was previously disabled using the SolarEdge Key	Enable the SafeDC using the SolarEdge Key..
Pairing to the inverter failed	The power optimizers are shaded	If you connected the inverter to the SolarEdge monitoring portal using one of the communication options, you can perform pairing remotely. Before leaving the site, make sure that the inverter ON/OFF switch is ON and S_OK indication appears on the LCD to indicate connection to the monitoring portal.

Appendix B: Technical Specifications

Single Phase 3-6kW Inverters

	SE3000A-US	SE3800A-US	SE5000A-US	SE6000A-US	Units
OUTPUT					
Nominal AC power output	3300	3840	5200@208V 5520@240V	6000	VA
Maximum AC power output	3300	4150	5600@208V 6000@240V	6000	VA
AC Output Voltage Min.-Nom.-Max.[1] 183-208-229 Vac	-	-	✓	-	
AC Output Voltage Min.-Nom.-Max.[1] 211-240-264 Vac	✓	✓	✓	✓	
AC frequency min-nom-max	59.3 - 60 - 60.5 (with HI country setting: 57 - 60 - 60.5)				Hz
Max. output fault current and duration @208V	---	---	26 / 20	---	A / ms
Max. output fault current and duration @240V	14 / 20	17.5 / 20	23 / 20	27.5 / 20	A / ms
Max. continuous output current	14	16	25@208V 23@240V	25	A
Max. output overcurrent protection	40				A
Power factor	1				
GFDI	1				A
Utility monitoring, islanding protection, country configurable thresholds	Yes				

[1] For other regional settings, please contact SolarEdge support.

	SE3000A-US	SE3800A-US	SE5000A-US	SE6000A-US	Units
INPUT					
Maximum DC power (Module STC) [1]	4100	4800	6500	7500	W
Transformer-less, ungrounded	Yes				
Maximum input voltage	500				Vdc
Nominal DC input voltage	325 @ 208V / 350 @ 240V				Vdc
Maximum input current [2]	11	13	17 @ 208V 17 @ 240V	18	Adc
Maximum input short circuit current	30				Adc
Maximum input source back-feed current	0				A
Reverse-polarity protection	Yes				
Ground-fault isolation detection	600 kΩ Sensitivity				
Maximum inverter efficiency	97.7	98.2	98.3	98.3	%
CEC weighted efficiency	97.5	98	97.5@208V 98@240V	97.5	%
Night time power consumption	< 2.5				W
ADDITIONAL FEATURES					
Supported communication interfaces	RS485, RS232, Ethernet, ZigBee (optional)				
STANDARD COMPLIANCE					
Safety	UL1741, UL1699B, UL1998, CSA 22.2				
Grid connection standards	Utility interactive, IEEE1547				
Emissions	FCC part15 class B				
RoHS	Yes				
INSTALLATION SPECIFICATIONS					
AC output conduit size / AWG range	3/4" minimum / 24-6 AWG				
DC input conduit size / # of strings / AWG range	3/4" minimum / 1-2 strings / 24-6 AWG				

[1] Limited to 125% for locations where the yearly average high temperature is above 77ºF/25ºC and to 135% for locations where it is below 77ºF/25ºC. For detailed information, refer to http://www.solaredge.us/files/pdfs/inverter_dc_oversizing_guide.pdf.

[2] A higher current source may be used; the inverter will limit its input current to the values stated.

	SE3000A-US	SE3800A-US	SE5000A-US	SE6000A-US	Units
Dimensions (H x W x D)	21 x 12.5 x 7 / 540 x 315x 172		21 x 12.5 x 7.5 / 540 x 315 x 191		in/mm
Dimensions (H x W x D) with AC/DC Safety Switch	30.5 x 12.5 x 7/ 775 x315 x 172		31.9 x 12.5 x 7.5 / 818 x 315 x 191		in/mm
Weight	44.7 / 20.2		47.7/21.7		lb/kg
Weight with AC/DC Switch	51.2/ 23.2		54.7/24.7		lb/kg
Cooling	Natural Convection				
Noise (typical)	<25				dBA
Minimum and maximum operating temperature range[1]	-13 to +140 / -25 to +60 (CAN version[2] -40 to +60)				˚F/˚C
Storage temp range	-13 to +140/ -25 to +60				˚F/˚C
Protection rating	NEMA 3R				

Recommended OCPD size per grid (you may use a larger size than that recommended but never above 40A):

Inverter	208 VAC	240 VAC
SE3000A-US	---	20 A
SE3800A-US	---	20 A
SE5000A-US	30 A	30 A
SE6000A-US	---	35 A or 40 A

[1] SolarEdge's 5kW and 6kW inverters operate at full power and full currents up to a temperature of 120°F/50°C. The inverters may be used above this temperature with reduced ratings. For more information, refer to http://www.solaredge.us/files/pdfs/se-temperature-derating-note.pdf.

[2] CAN P/Ns are eligible for the Ontario FIT and microFIT

Single Phase 7.6-11.4 kW Inverter

	SE7600A-US	SE10000A-US	SE11400A-US	Units
OUTPUT				
Nominal AC Power Output	7680	9980 @ 208V 10080 @240V	11520	VA
Maximum AC Power Output	8350	10800 @ 208V 10950 @240V	12000	VA
AC Output Voltage Min.-Nom.-Max. 183 - 208 - 229 Vac	-	✓	-	
AC Output Voltage Min.-Nom.-Max. 211 - 240 - 264 Vac	✓	✓	✓	
AC Frequency Min-Nom-Max	59.3 - 60 - 60.5 (with HI country setting 57 - 60 - 60.5)			Hz
Max. Continuous Output Current	32	48 @ 208V / 42 @ 240V /	48	A
GFDI Threshold	1			A
Utility Monitoring, Islanding Protection, Country Configurable Set Points	Yes			
INPUT				
Recommended Maximum DC Power[1] (Module STC)	9600	12400	14400	W
Transformer-less, Ungrounded	Yes			
Maximum Input Voltage	500			Vdc
Nominal DC Input Voltage	325 @ 208V / 350@ 240V			Vdc
Maximum Input Current[2]	23.5	33 @ 208V / 30.5 @ 240V	35	Adc
Reverse-Polarity Protection	Yes			
Ground-Fault Isolation Detection	600kΩ Sensitivity			
Maximum Inverter Efficiency	98			%
CEC Weighted Efficiency	97.5	97@208/ 97.5@240	97.5	%
Night-time Power Consumption	< 4			W
ADDITIONAL FEATURES				
Supported Communication Interfaces	RS485, RS232, Ethernet, ZigBee (optional)			

STANDARD COMPLIANCE		
Safety	UL1741, UL1699B, UL1998, CSA 22.2	

[1] Limited to 125% for locations where the yearly average high temperature is above 77ºF/25ºC and to 135% for locations where it is below 77ºF/25ºC. For detailed information, refer to http://www.solaredge.us/files/pdfs/inverter_dc_oversizing_guide.pdf

[2] A higher current source may be used; the inverter will limit its input current to the values stated.

	SE7600A-US	SE10000A-US	SE11400A-US	Units
Grid Connection Standards	IEEE1547			
Emissions	FCC part15 class B			
INSTALLATION SPECIFICATIONS				
AC output conduit size / AWG range	3/4" minimum / 8-3 AWG			
DC input conduit size / # of strings / AWG range	3/4" minimum / 1-2 strings / 14-6 AWG			
Dimensions (HxWxD)	21 x 12.5 x 10.5 / 540 x 315 x 260			in/mm
Dimensions with AC/DC Safety Switch (HxWxD)	30.5 x 12.5 x 10.5 / 775 x 315 x 260			in/mm
Weight	82 / 37			lb/kg
Weight with AC/DC Safety Switch	88.4 / 40.1			lb/kg
Cooling	Fans (user replaceable)			
Noise (typical)	< 50			dBA
Operating Temperature Range	-13 to +140 / -25 to +60 (CAN version[1] -40 to +60)			°F/°C
Protection Rating	NEMA 3R			

Recommended OCPD size per grid (you may use a larger size than that recommended but never above 60A):

Inverter	208 VAC	240 VAC
SE7600-US	---	40 A
SE10000-US	60 A	60 A
SE11400-US	---	60 A

[1] CAN P/Ns are eligible for the Ontario FIT and microFIT (microFIT exc. SE11400A-US-CAN)

Three Phase Inverters

	SE9kUS	SE10kUS	SE20kUS	Units
OUTPUT				
Rated AC power output	9000	10000	20000	VA
Maximum AC power output	9000	10000	20000	VA
AC output voltage minimum-nominal-maximum (L-N)	105-120-132.5	244-277-305		Vac
AC output voltage minimum-nominal-maximum (L-L)	183-208-229	422.5-480-529		Vac
AC frequency min-nom-max	59.3 - 60 - 60.5 (with HI country setting 57 - 60 - 60.5)			Hz
Max. continuous output current (per Phase)	25	12	24	A
Max. output fault current and duration	26 / 20	12 / 20	24 / 20	A / mS
Max. back-feed current	0			A
GFDI threshold	1			A
Utility monitoring, islanding protection, country configurable set points	Yes			
INPUT				
Maximum DC power (Module STC)[1]	11250	12500	25000	W
Transformer-less, ungrounded	Yes			
Maximum input voltage DC to Gnd	250	490		Vdc
Maximum input voltage DC+ to DC-	500	980		Vdc
Nominal input voltage DC to Gnd	200	425		Vdc
Nominal input voltage DC+ to DC-	400	850		Vdc
Maximum input current[2]	26.5	13.5	26.5	Adc
Reverse-polarity protection	Yes			
Ground-fault isolation detection	1MΩ Sensitivity			
Maximum inverter efficiency	97.1	98.2	98.1	%
CEC weighted efficiency	96.5	98	98	%
Night-time power consumption	< 3			W

[1] Limited to 125% for locations where the yearly average high temperature is above 77ºF/25ºC and to 135% for locations where it is below 77ºF/25ºC. For detailed information, refer to http://www.solaredge.us/files/pdfs/inverter_dc_oversizing_guide.pdf

[2] A higher current source may be used; the inverter will limit its input current to the values stated.

	SE9kUS	SE10kUS	SE20kUS	Units
ADDITIONAL FEATURES				
Supported communication interfaces	RS485, RS232, Ethernet, ZigBee (optional)			
STANDARD COMPLIANCE				
Safety	UL1741, CSA 22.2			
Grid connection standards	IEEE1547			
Emissions	FCC part15 class B			
RoHS	Yes			
INSTALLATION SPECIFICATIONS				
AC output conduit size / AWG range	3/4" minimum / 24-6 AWG			
DC input conduit size / # of strings / AWG range	3/4" minimum / 1-2 strings / 24-6 AWG			
Dimensions (HxWxD)	21 x 12.5 x 10.5 / 540 x 315 x 260			in/mm
Dimensions with AC/DC Switch (HxWxD)	30.5 x 12.5 x 10.5 / 775 x 315 x 260			in/mm
Weight	73.2 / 33.2			lb/kg
Weight with AC/DC Switch	79.7 / 36.2			lb/kg
Cooling	Fans (user replaceable)			
Noise (typical)	< 50			dBA
Operating temperature range[1]	-13 to +140 / -25 to +60 (CAN version[2] -40 to +60)			°F/°C
Protection rating	NEMA3R			

Recommended OCPD size per grid (you may use a larger size than that recommended but never above 40A):

Inverter	208 VAC	480 VAC
SE9kUS	35A	---
SE10kUS	---	15A
SE20kUS	---	30A

[1] SolarEdge's 9kW and 20kW inverters operate at full power and full currents up to a temperature of 117°F/47°C. The inverters may be used above this temperature with reduced ratings.

[2] CAN P/Ns are eligible for the Ontario FIT and microFIT.

Default Trip Limits and Times According to IEEE1547

NOTE!

The inverters are equipped with adjustable utility protective function set-points, and can be aggregated above 30kW on a single Point of Common Connection. The default settings are in compliance with IEEE1547. Utility authorization is required to change these set-points.

Voltage Range (% of Base Voltage)	Max. Clearing Time (Sec)
V < 50%	0.16
50 % < V < 88%	2.00
100% < V < 120	1.00
V > 120 %	0.16
Frequency Range (Hz)	**Max. Clearing Time (Sec)**
> 60.5	0.16
< 59.3 (Hawaii – 57; with slow trip at 57.5)	0.16

AC/DC Safety Switch

Specifications	Single Phase 3-6 kW	Single Phase 7.6 – 11.4 kW	Three Phase	Unit
Maximum DC voltage	600		490	Vdc
Maximum DC current	32	36.5	32	Adc
Nominal AC voltage	277 / 240 / 208		480 / 208	Vac
Maximum AC current	32	50	32	Aac
Ambient temperature	-40 to 149 / -40 to +65	-40 to 140 / -40 to +60	-40 to 140/-40 to +60	°F /°C
Weight	5.29 / 2.4	6.6 / 3.0		lb/kg

Appendix C: Mechanical Specifications

Inverter and Mounting Bracket Dimensions

The following figures provide dimensions of the mounting brackets for the single and three phase inverters.

Type 1 mounting bracket weighs 2.87 lbs. / 1.3 kg.

Type 2 mounting bracket weighs 0/9 lb. / 0.4 kg

Single Phase 3-6 kW Inverter and Mounting Bracket Type 1

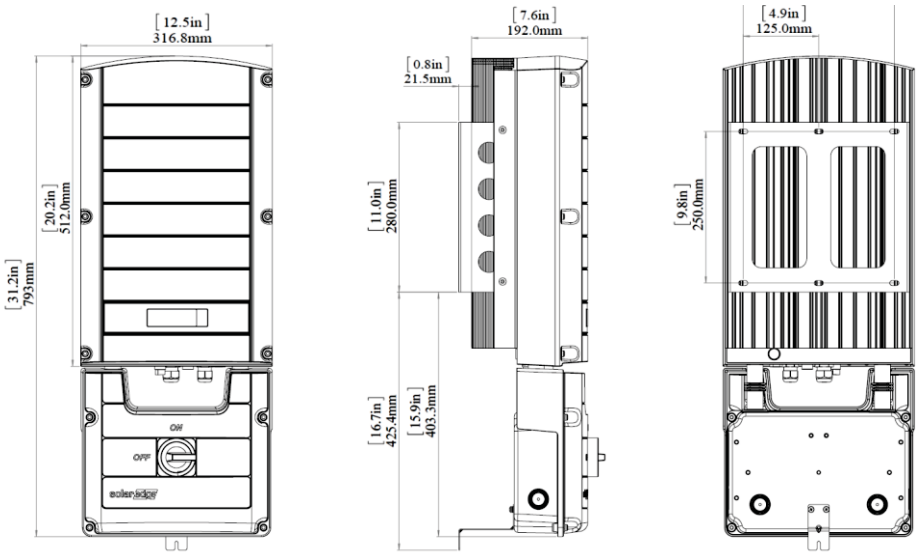


Figure 41: Single phase 3-6 kW inverter with brackets - front, side and rear views

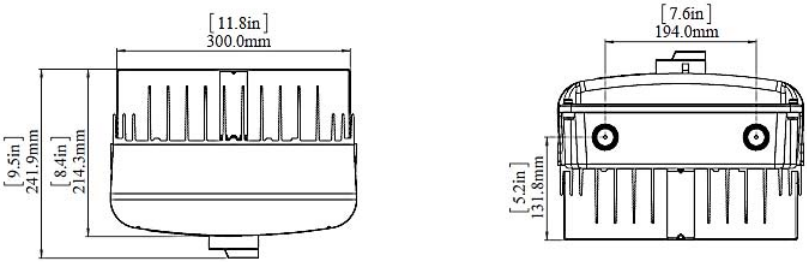


Figure 42: Single phase inverter 3-6 kW with brackets - top and bottom views

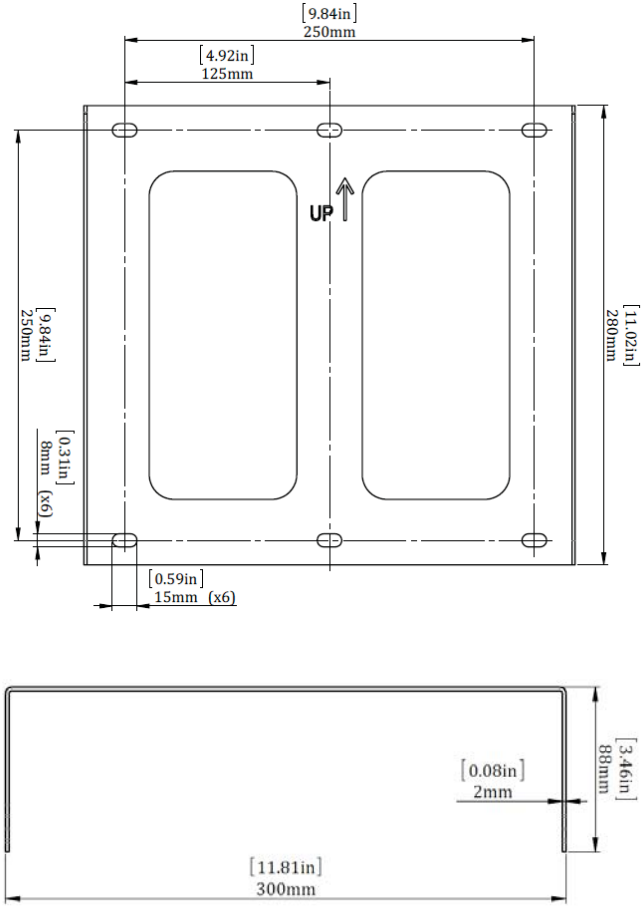


Figure 43: Single phase 3-6 kW inverter mounting bracket

Single Phase 3-6 kW Inverter and Mounting Bracket Type 2

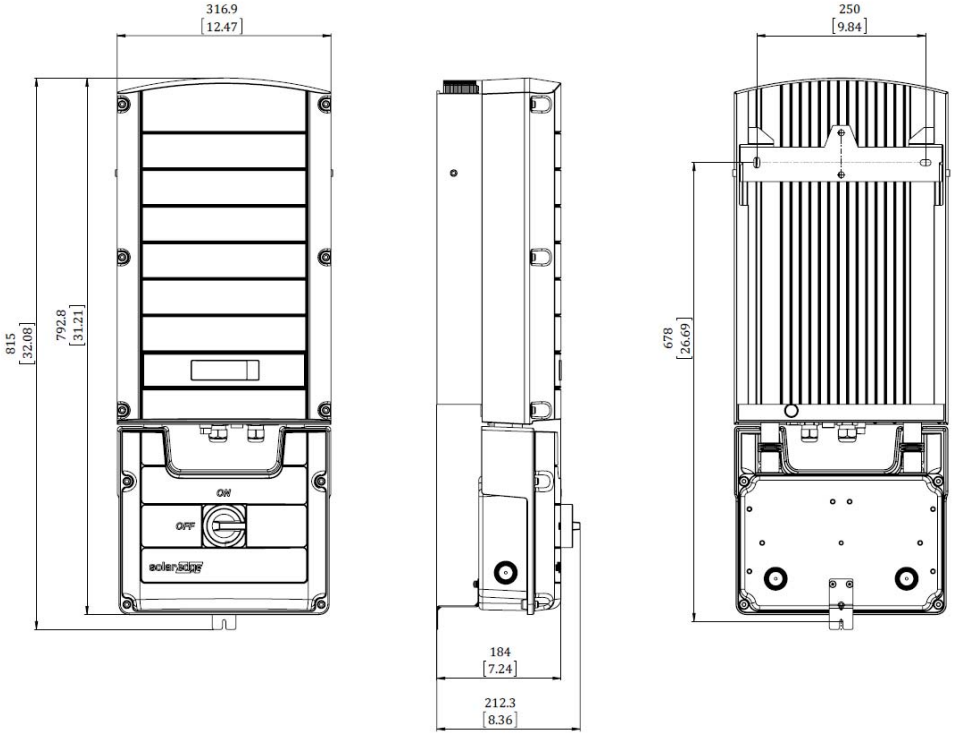


Figure 44: Single phase 3-6kW inverter with brackets - front, side and rear views

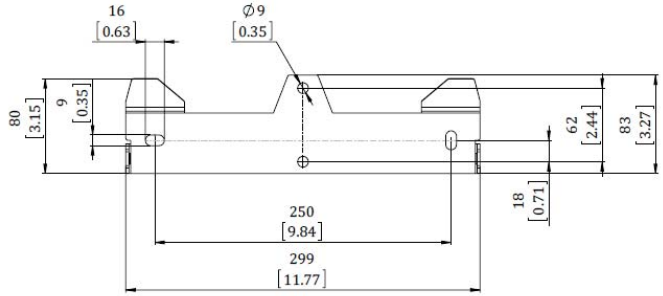


Figure 45: Single phase 3-6kW inverter mounting bracket

Single Phase 7-11.4 kW Inverter and Mounting Bracket Type 2

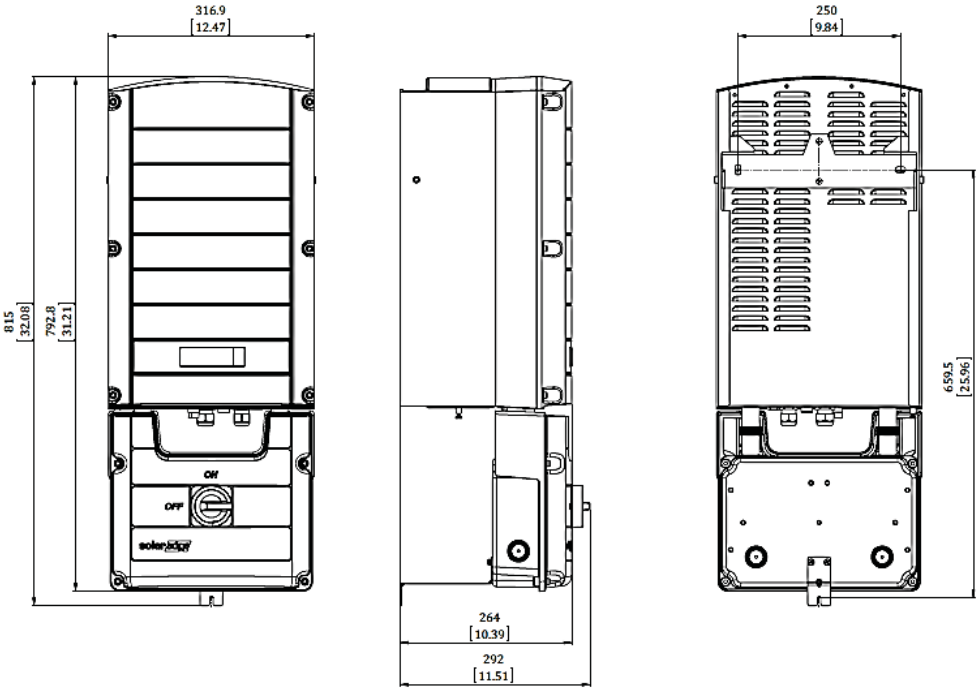


Figure 46: Single phase 7-11.4 kW inverter with brackets - front, side and rear views

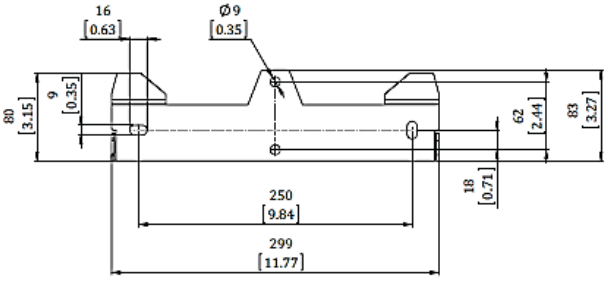


Figure 47: Single phase 7-11.4 kW inverter mounting bracket

Three Phase Inverter and Mounting Bracket Type 1

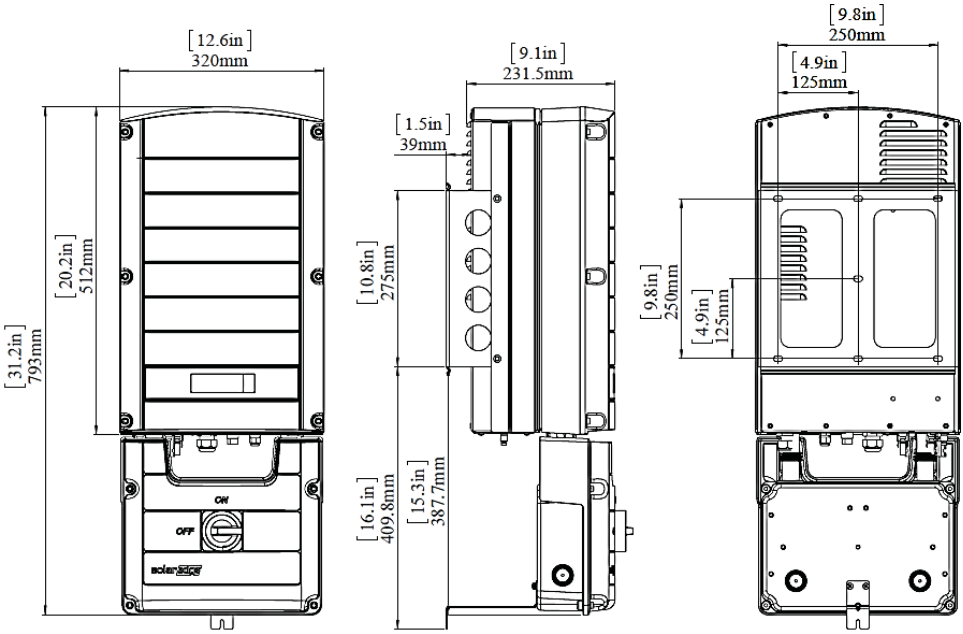


Figure 48: Three phase inverter with brackets – front, side and rear views

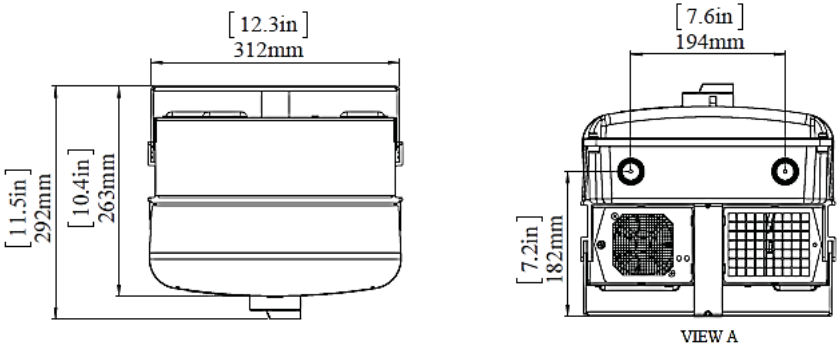


Figure 49: Three phase inverter with brackets – top and bottom views

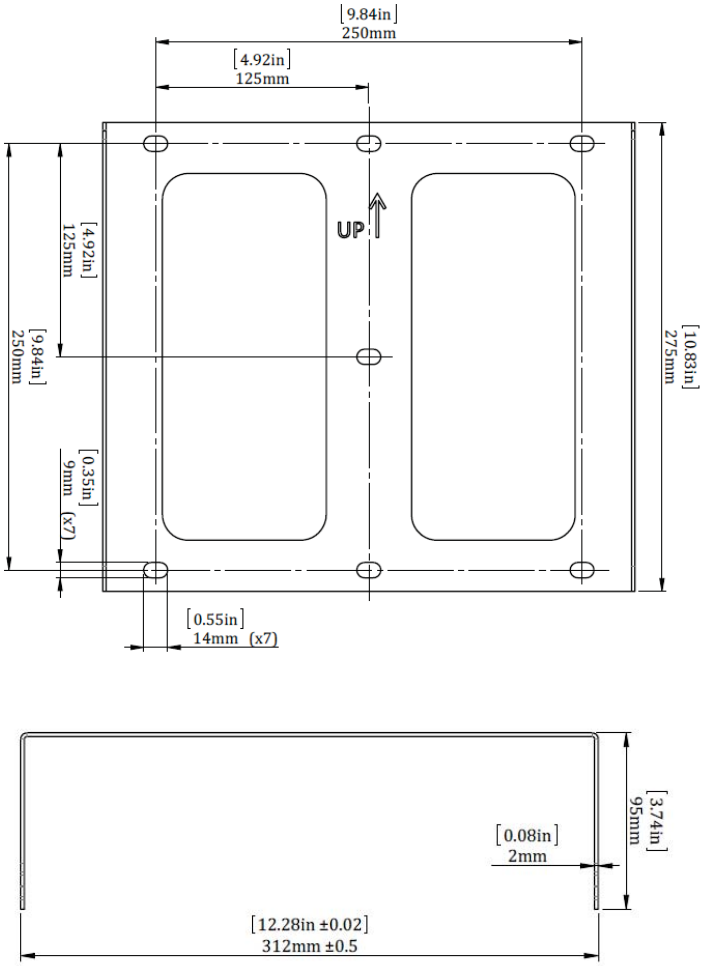


Figure 50: Three phase inverter mounting bracket

Three Phase Inverter and Mounting Bracket Type 2

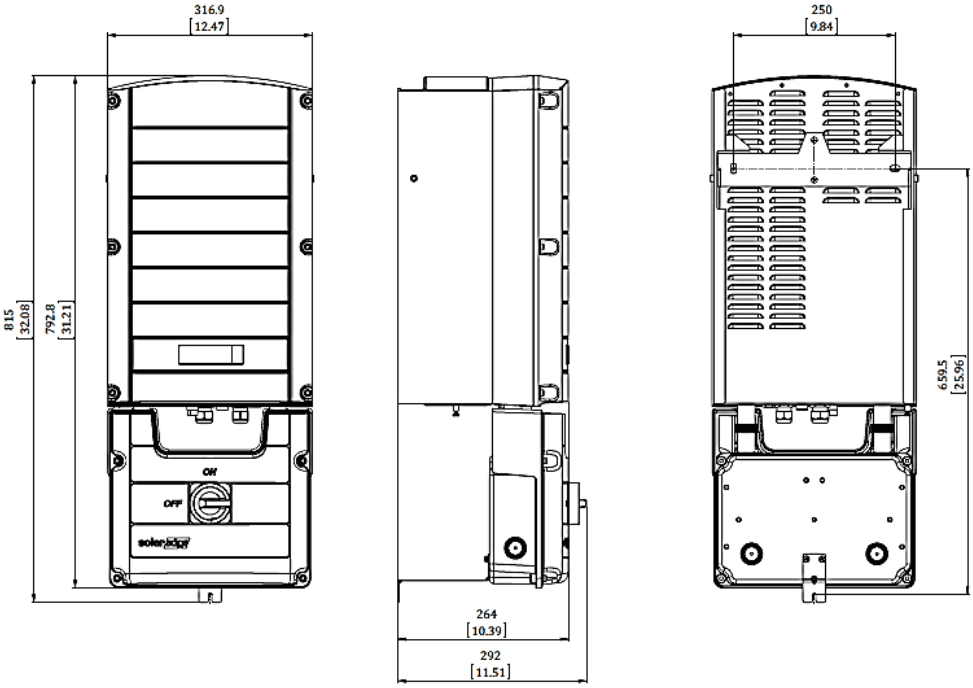


Figure 51: Three phase inverter with brackets - front, side and rear views

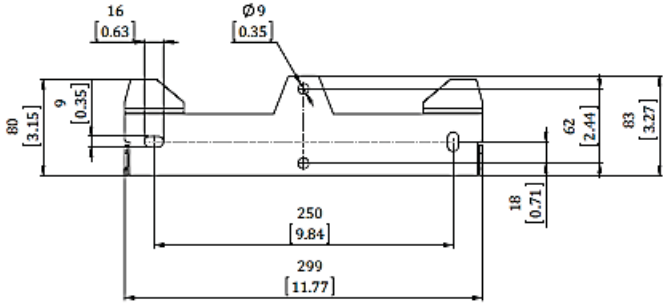


Figure 52: Three phase inverter mounting bracket

Appendix D: Fan Maintenance and Replacement

The three phase and single phase 7.6-11.4kW inverters have two fans, one is internal and requires a SolarEdge technician to replace it (Fan 1) and the other is accessible from the outside of the inverter (Fan 2). A replacement kit is available from SolarEdge.

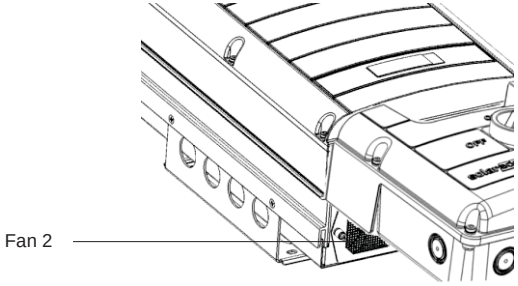


Figure 53: Inverter fan 2

Fan Maintenance

1. At least once a year, open the fan screen and clean the accumulated dust using a brush.
2. Check the Fan Health Status screen on the LCD (refer to *Fan Health Status – Three Phase Inverters* on page 52).
3. If one of the following occurs, replace the fan as described below:
   - When the fan stops operating
   - Fan status is **Replace**
   - Fan status is **Not Working**; Before replacing the fan turn the inverter AC off and on and check if the status is cleared
   - The following Error is displayed:

```
Fan 2 Failure
```

Fan 2 Replacement

1. Turn OFF the inverter ON/OFF switch, and wait until the LCD indicates that the DC voltage is safe (<50V), or wait five minutes before continuing to the next step.

WARNING!

If you cannot see the inverter panel, or if a malfunction is indicated on the LCD panel, wait five minutes for the input capacitors of the inverter to discharge.

Si vous ne pouvez pas voir l'écran de l'onduleur ou si un dysfonctionnement est indiqué sur l'écran LCD, attendez cinq minutes pour que les condensateurs d'entrée de l'onduleur soient déchargés.

2. Turn OFF the AC/DC Safety Switch and the AC switch of the distribution panel.
3. Use a Philips screwdriver to unfasten the single screw of the fan cover.

4 Open the fan door.

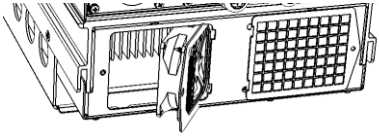


Figure 54: Fan door open

5 Disconnect the fan connector and remove the fan.

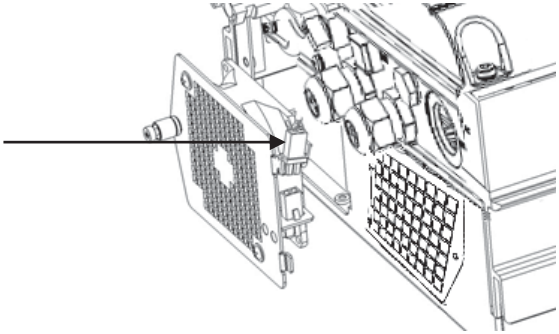


Figure 55: Fan connector

6 Connect the fan connector to the new fan.

7 Close the fan door and fasten the cover screw.

8 Check the *Fan Health Status – Three Phase Inverters* as described on page 52.

Appendix F: Replacing and Adding System Components

NOTE:
If you are permanantly disassembling the installation or part of it, make sure to use the disposal methods dictated by local regulations.

Replacing an Inverter

1. Turn OFF the inverter ON/OFF switch, and wait until the LCD indicates that the DC voltage is safe (<50V), or wait five minutes before continuing to the next step.

   WARNING!
   If you cannot see the inverter panel, or if a malfunction is indicated on the LCD panel, wait five minutes for the input capacitors of the inverter to discharge.

   Si vous ne pouvez pas voir l'écran de l'onduleur ou si un dysfonctionnement est indiqué sur l'écran LCD, attendez cinq minutes pour que les condensateurs d'entrée de l'onduleur soient déchargés.

2. Turn OFF the AC/DC Safety Switch and the AC switch of the distribution panel.
3. Open the inverter cover.
4. Disconnect the DC and AC wires from the inverter. If there are ferrite beads on the DC and AC wires in the inverter, open the beads and set them aside .
5. Unscrew the two conduit nuts in the inverter securing the AC/DC Safety Switch to the inverter.
6. Remove the two screws securing the inverter to the mounting bracket and remove the inverter from the mounting bracket.

   NOTE:
   If you remove the old inverter and do not immediately install a new one, then:
   - Lock the AC/DC Safety Switch in the OFF position using a lock on the switch.
   - Use insulation tape to isolate each of the AC and DC wires.
   - Seal the open conduits using duct tape.

7. Place the new inverter on the mounting bracket; insert the screws securing the inverter to the mounting bracket.
8. Screw the two conduit nuts in the inverter securing the AC/DC Safety Switch to the inverter.
9. Connect the DC and AC wires to the inverter. Refer to *Connecting the AC/DC Safety Switch to the Inverter* on page 91.
10. If ferrite beads were removed from the DC and AC wires, place them on the wires and close them. Make sure the DC labeled ferrite bead is placed on the DC wires and the AC labeled ferrite bead is placed on the AC wires.
11. Close the inverter cover.
12. Perform the commissioning steps as described in *Chapter 5: Commissioning the Installation* on page 35 .

Replacing the AC/DC Safety Switch

Mounting a New AC/DC Safety Switch

1 Turn OFF the inverter ON/OFF switch, and wait until the LCD indicates that the DC voltage is safe (<50V), or wait five minutes before continuing to the next step.

WARNING!

If you cannot see the inverter panel, or if a malfunction is indicated on the LCD panel, wait five minutes for the input capacitors of the inverter to discharge.

Si vous ne pouvez pas voir l'écran de l'onduleur ou si un dysfonctionnement est indiqué sur l'écran LCD, attendez cinq minutes pour que les condensateurs d'entrée de l'onduleur soient déchargés.

2 Turn OFF the AC/DC Safety Switch and the AC switch of the distribution panel.

3 Open the inverter cover.

4 Disconnect the DC and AC wires from the inverter. If there are ferrite beads on the DC and AC wires in the inverter, open and set them aside.

5 Unscrew the two conduit nuts in the inverter securing the AC/DC Safety Switch to the inverter.

6 Open the AC/DC Safety Switch cover and disconnect the external DC and AC wires. Unscrew the two conduit nuts securing the AC/DC Safety Switch to the external conduits.

7 Remove the AC/DC Safety Switch with its mounting bracket from the wall.

8 Open the conduit knockouts of the new AC/DC Safety Switch (refer to *Opening Conduit Knockouts* on page 24).

9 Position the new AC/DC Safety Switch below the inverter and from the inside of the inverter grab the AC and DC wires extending from the switch conduits, as shown below:

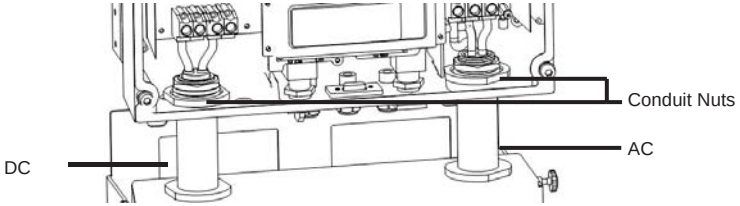


Figure 56: Inserting the AC and DC conduits

10 Attach the safety switch with its bracket to the wall and slightly close the screws. Do not over tighten.

11 Securely screw the two conduit nuts onto the conduit ends in the inverter.

12 Connect the DC and AC wires to the inverter. Refer to *Connecting the AC/DC Safety Switch to the Inverter* on page 91.

13 If ferrite beads were removed from the DC and AC wires, place them on the wires and close them. Make sure the DC labeled ferrite bead is placed on the DC wires and the AC labeled ferrite bead is placed on the AC wires.

14 Connect the external DC and AC wires to the AC/DC Safety. Refer to *Chapter 4: Connecting the AC and the Strings to the AC/DC Safety Switch* on page 28.

Connecting the AC/DC Safety Switch to the Inverter

1 Connect the DC, as follows:

- Connect the red wire to any of the DC+ terminals in the inverter.
- Connect the black wire to any of the DC- terminals in the inverter.

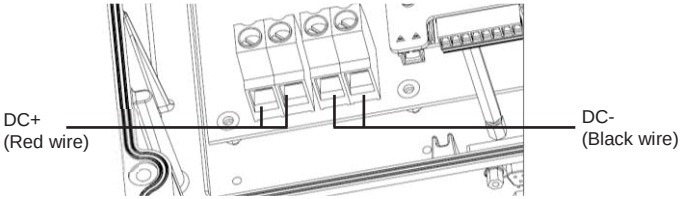


Figure 57: Single phase 3-6kW inverter DC terminals

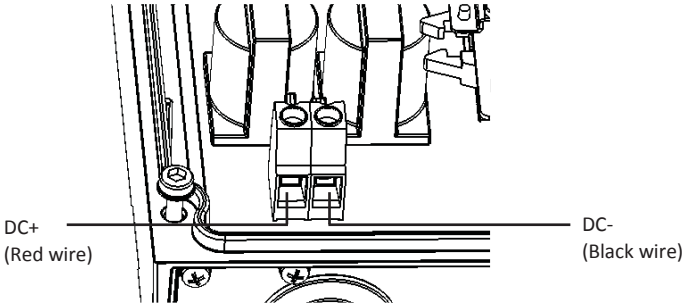


Figure 58: Single phase 7.6-11.4 kW and three phase inverter DC terminals

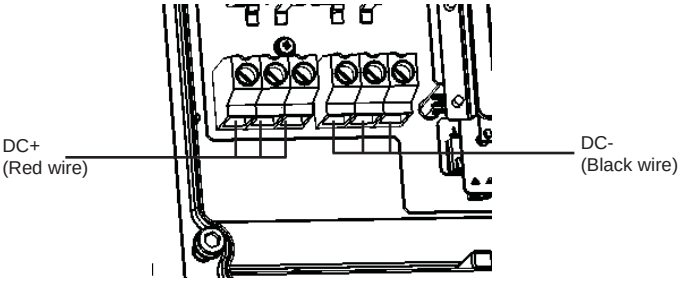


Figure 59: Single phase 7.6-11.4 kW and three phase inverter DC terminals

2 Depending on the inverter type, connect the AC, as follows:

Single Phase Inverter 3-6 kW	
Wire color	**Connect to terminal**
White	B
Green/yellow	C
Red	D
Black	E

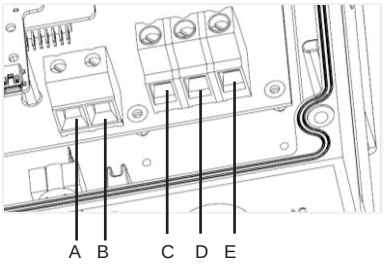


Figure 60: Single phase 3-6 kW inverter AC terminals

Single Phase Inverter 7.6-11.4 kW	
Wire color	**Connect to terminal**
Red	B
Black	C
White	D
Green/yellow	E

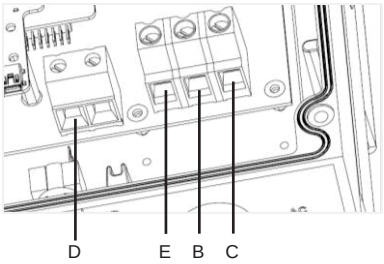


Figure 61: Single phase inverter AC terminals

Three Phase Inverter	
Wire color/label	**Connect to terminal**
Black / L1	L1
Black / L2	L2
Black / L3	L3 (feeds the internal power supply)
Green/yellow	Ground
White	N

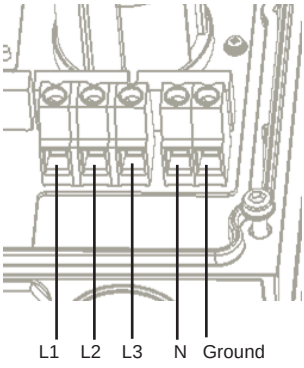


Figure 62: Three phase inverter AC terminals

3 Tighten the screws of each terminal with a torque of 1.2-1.5 N*m / 0.88-1.1 lb.*ft.

4 Verify that there are no unconnected wires at the output of the AC/DC Safety Switch and that the unused terminal screws are tightened.

Adding, Removing or Replacing Power Optimizers

1. Turn OFF the inverter ON/OFF switch, and wait until the LCD indicates that the DC voltage is safe (<50V), or wait five minutes before continuing to the next step.

WARNING!

If you cannot see the inverter panel, or if a malfunction is indicated on the LCD panel, wait five minutes for the input capacitors of the inverter to discharge.

Si vous ne pouvez pas voir l'écran de l'onduleur ou si un dysfonctionnement est indiqué sur l'écran LCD, attendez cinq minutes pour que les condensateurs d'entrée de l'onduleur soient déchargés.

2. Turn OFF the AC/DC Safety Switch and the AC switch of the distribution panel.
3. Disconnect and connect the necessary power optimizers.
4. Perform pairing and other procedures described in *Chapter 5: Commissioning the Installation* on page 35 on all inverters to which power optimizers were added or from which power optimizers were removed.
5. In the monitoring portal, replace the serial number of the removed power optimizer with serial number of the newly installed power optimizer.

Appendix G: Inverter Arc Detection and Interruption

The arc detection option is disabled by default. It must be enabled when UL1699B compliance is required. When enabled, the inverter performs an automatic self-test for arc fault each time the inverter wakes-up or is switched ON.

To enable/disable arc detection:

1. Use the LCD light button to enter Setup mode (refer to *Configuring the Inverter Using the External LCD Light Button* on page 43).
2. Short-press the LCD light button to reach the **Maintenance** menu.
3. Select **AFCI** ➔ **Enable** or **Disable**.

To manually test the arc detection functionality:

1. Make sure the inverter ON/OFF switch is turned ON.
2. Use the LCD light button to select **Maintenance** ➔ **Manual AFCI Test**.

- If the test is successful, the following message is displayed:

```
Manual Test PASS
```

- The inverter production is then interrupted (as if a real arc detection has occurred), and the following error message is displayed (numbered either 150 or 151):

```
Error 151
Arc Fault Detected
```

- Perform manual restart to resume system operation: Turn the inverter ON/OFF switch to OFF and then to ON. The inverter performs an arc detection self-test and starts normal operation.
- If the test fails, contact SolarEdge support.

To troubleshoot arc-fault failures:

The inverter continuously performs arc detection while producing power. If an electric arc occurred in the PV system, the inverter detects it and stops producing power. The following error message is displayed (numbered either 150 or 151):

```
Error 151
Arc Fault Detected
```

If this message is displayed:

1. Turn the inverter ON/OFF switch to OFF.
2. Check all PV strings for the correct open-circuit voltage:
   - Inspect all connections and cables between the power optimizers in the strings: Verify they are connected properly by firmly pushing the plugs and verifying the connectors are locked.
   - Inspect all connections and cables between the PV modules and the power optimizers: Verify they are connected properly by firmly pushing the plugs and verifying the connectors are locked.
   - Verify that the strings are firmly attached to the AC/DC Safety Switch terminal blocks.
3. Perform manual restart to resume system operation: Turn the inverter ON/OFF switch to OFF and then ON. The inverter performs an arc detection self-test and starts normal operation.

To troubleshoot self-test failures:

If the self-test fails, the inverter displays an error message indicating that the arc detector hardware failed during wake-up tests:

```
Error 152
AFCI
self-test failed
```

The inverter transmits an error message to the monitoring portal, and continuously repeats the arc detection self-test until it is successful.

If the problem persists, contact SolarEdge support.

If you have technical queries concerning our products, please contact our support through SolarEdge service portal:
http://www.solaredge.com/groups/support/services

USA and Canada:	1 (0) 877 360 529 2
Worldwide:	972 (0) 73 240 311 8
Fax:	1 (0) 530 273 276 9
Email:	support@solaredge.us

www.solaredge.us

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